REMARKS

With respect to the Drawings:

The following amended sheets of Drawings are attached, both in a marked-up copy and in a formal copy containing the amendments: Sheets 1, 2, 3, 5, 11, 13, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 38, 41, 42, 43, 45.

The following amended pages of the Description are enclosed, both in a marked-up copy and in a formal copy containing the amendments: Pages 13 - 19, 21 - 59.

Both the Drawings and the Description have been corrected to ensure that each reference numeral is located both in the Drawings and in the Description.

Where it is evident from the Description which part of the Drawings is referred to, the corresponding reference numeral/s shown in the Drawings has/have been inserted into the Description. Reference numerals appearing in parts of the Drawings which are not explicitly referred to in the Description have been deleted, as have reference numerals appearing in the Description but not in the Drawings. Where it is evident that a reference numeral or Figure number has been used in error in the Description, the mistake has

been corrected.

Attention is drawn in particular to the following points:

1) At p.16 lines 13 and 15 the numbers "443" and "80" are intended to represent by way of illustration the numbers of ports of the Central Servers, and therefore are not found as reference numerals in the drawings. These port numbers have been enclosed in inverted commas in the attached amended sheets for clarity.

2) It is noted that since the Figures respectively refer to the various parts of an interconnected system, reference numerals referred to in any given passage of the Description may necessarily refer to more than one of the Figures. Where the location of any reference numeral may not be immediately apparent to the reader, references to the Figure in which that numeral appears have accordingly been added.

3) Where alternative reference numerals have been used for the same element (e.g. Customers 400, 1200, 600) the specification and/or the drawings have been amended for the sake of clarity to use the same reference numeral throughout (e.g. Customers 1200).

4) It is noted that the designation "L100" is used repeatedly throughout the Figures but is not referenced in the Description as filed. It is clear from its juxtaposition with reference numerals and text in the Figures that "L100" is in fact a shorthand designation for the CENTRAL CONSOLE 901.

Thus for instance in Fig. 10, box 315, "Delivery man presents the delivery bar-code on the parcel to the L100 bar-code reader". The relevant passage of the Description is at p.38 lines 17-19: "....the deliverer...will then present the package to the bar-code reader of the CENTRAL CONSOLE in step 315." Similarly in Fig. 11, box 402: "L100 prompts customer for collection code." The relevant passage is at p.41 lines 1-2: "....the CENTRAL CONSOLE prompts him for his Collection Code in step 402." There are similar instances in Figs.10, 10a, 10b, 11, 11a, 12, 12a, 15, and elsewhere, and in each case it is clear that the central console is the element referred to.

In Fig. 5, the reference "L100" is used in two places in conjunction with the reference numeral 901, which in the Description indicates the Central Console.

The only place in which applicant is aware of any alternative use of the designation "L100" is in Fig. 7, where L100

is used in conjunction with the reference numeral 900. This reference numeral is referred to in the Description as indicating the ACP Site which (as shown in Fig. 5) in turn contains the Central Console 901.

Accordingly the words "or L100" have been added to the Description at p.27, line 7, under heading "D. Description of the ACP Site 900 figure 5". The phrase thus reads "... the central console or "L100" 901 has a user interface...". This it is hoped will assist the reader in understanding the designation "L100" where it occurs throughout the Figures.

With respect to the Claim Rejections:

Claims 1 - 26 and Claims 37 - 51 are hereby deleted.

With respect to Claims 27, 28-36:

Claim 27 includes the following elements:

-comparison of alternative collection points to select a collection point based on the customer's home address,

- comparison of delivery costs corresponding respectively to alternative delivery services to the selected collection point, and

- construction of a shipping options web page which is

presented to the customer. The shipping options web page gives the customer a list of alternative delivery costs corresponding respectively to alternative delivery services to the selected collection point.

Comparative delivery information is thus collated and presented to the customer so that the customer can determine which delivery option he prefers. The customer's determination is then implemented in accordance with the invention.

In contrast, Tsukuda teaches a system which interfaces with the customer but is not concerned with costs calculation, whereas Altendahl teaches an essentially internal system for the automation of the delivery costs calculation process within a delivery organization, without reference to the customer. Thus in Tsukuda there is no costs information at all, whilst in Altendahl the costs information remains opaque to the customer. In contrast, the present invention is directed to what is essentially an interface between the customer, a collection point organization, and a plurality of couriers, wherein the customer is apprised of the comparative delivery costs information and thus integrated into the decision making process.

In Tsukuda, goods are delivered either directly to the

customer's home or via an "agency" such as a collection point. The disclosure is directed to the management of the data representing the nature of the goods which are ordered, the customer's address and preferred delivery time details, the availability and suitability of a collection point to receive the specified goods, and the collection or non-collection of the goods from the collection point by the customer. The system is designed to manage the date and time of delivery and to alter the delivery in response to the changing requirements of the customer. There is no reference however to the selection of a collection point based on proximity the client's home address, from a list of alternative collection points. Neither is there any reference to the selection of a collection point based on a list of alternative delivery costs; indeed, there is no reference at all to delivery costs information, which is the crux of the present claim. Lastly there is no reference to the presentation of comparative delivery information to the customer and implementation of the customer's determination, still less in the form of a shipping options web page.

As to Altendahl, there is disclosed a set of logical modules for use within a shipping organization for routing parcels via alternative routes and consolidating costs for each shipment.

The system is predicated on the existence of a predetermined delivery address for each parcel; thus there is no suggestion that a list of alternative collection points might be provided as defined in the present claim, each relating to one or more customers of the system, nor any indication of how a collection point might be selected from such a list.

Further, the system of Altendahl is directed to the management of the shipping process within the shipping organization, so that each parcel is routed via the least cost route, and routing and consolidation decisions are taken based on cost comparison. There is no suggestion that comparative cost information should be presented to the customer, still less that this be achieved by means of a shipping options web page as defined in the present claim. Indeed, there is no interaction at all in Altendahl with the customer other than when the goods are delivered, except presumably for a billing operation of some sort which lies outside the scope of the disclosure. Altendahl thus discloses a logical system which is opaque to the customer.

Thus while Tsukuda fails to disclose the selection of a collection point based on geographical proximity to the customer, and further fails to disclose the collation and presentation to the

customer of comparative cost information, still less by means of a shipping options web page, Altendahl too fails to disclose either of these elements of the present claim. Further, there is no suggestion in either application that such steps would be desirable or possible.

It is submitted therefore that the skilled man in assessing the cited documents would understand each as a self-contained logical system for managing the delivery of goods, but would not derive from either application any incentive to combine the features thereof. Moreover, even if the two disclosures were combined, he would still not arrive at the system of the present claim, wherein the comparative cost information is presented to the customer via a shipping options web page. Instead, both documents teach a self contained system wherein the calculation of delivery costs is either absent or is managed without the involvement of the customer in the decision making process.

The present invention takes quite the opposite approach: by presenting comparative information to the customer, the customer is integrated into the system as a decision making element. It is submitted therefore that Claim 27 and hence also dependent claims 28 - 36 are novel and inventive over both of the cited documents,

taken both alone and in combination.

A petition for an automatic three month extension of the term is enclosed together with a form PTO-2038 charging the amount to a credit card of the undersigned. In addition, there is enclosed a request for a change in the correspondence address. A Power of Attorney has been requested from the Applicant and will be filed as soon as it comes to hand. In the meantime, note the new address given below.

Respectfully submitted,
The Firm of Karl F. Ross P.C.

By: Herbert Dubno, Reg. No. 19,752
Attorney for Applicant

db-
DATED: September 2, 2004
5676 Riverdale Avenue - Box 900
Bronx, NY 10471-0900
Cust. No.: 535
Tel: (718) 884-6600
Fax: (718) 601-1099
Encls: Petition for Ext.
PTO-2038
Subst. Specification
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UNITED STATES PATENT APPLICATION

OF

STEPHEN HUXTER

FOR

COURIER INDEPENDENT SYSTEM AND METHOD FOR THE DELIVERY OF GOODS ORDERED BY THE INTERNET

PREPARED BY WILSON SONSINI GOODRICH & ROSATI

BACKGROUND OF THE INVENTION

Cross Reference to Related Applications

This application is a continuation-in-part of U.S. Patent Application entitled "System and Method for Facilitating Receipt and Collection of Goods Ordered from Online Retailers", filed December 1, 2000 (WSGR Ref. No. 25350-703), and relates to U.S. Patent Application entitled "Single Courier Model for the Delivery of Goods Ordered by the Internet", filed January 10, 2001 (WSGR Ref. No. 25350-704), all of which are hereby incorporated by reference.

Field of the Invention

This invention relates to the field of e-commerce. In particular, the invention relates to network systems for facilitating the delivery of goods ordered from online retailers.

Description of the Related Art

Prior to the advent of web-based retailing, customers have typically purchased goods through store-based retailing or by contacting a vendor via telephone or mail. They may go to a retail store and conduct the purchase through a sales assistant store-based retailing, or conduct the purchase over the telephone by calling the vendor directly – this is usually in response to seeing the product in a vendor's catalog or seeing an advertisement for the product on the television, radio or other medium this is called catalog-based retailing.

Recently, a third approach to retailing has evolved: buying goods over the internet. Customers select their goods from the choice available on a vendor's web page. Payment is conducted typically with a credit card, which is authorized at the point of purchase. This

retail approach is referred to as "etailing"; vendors using the etailing model are referred to as "etailers".

Etailing has a number of advantages over both store-based retailing and catalog-based retailing. However, a key challenge for etailers is getting the goods to the customer in a way that is cheap and convenient. Catalog-based retailers have always faced a similar challenge, which is one of the main reasons why the growth of catalog-based retailing has been curtailed. So if etailers are to fulfill their potential, they need to address the problems with the current delivery infrastructure.

There are two problem areas with the current delivery infrastructure: cost and convenience. Each of these problems will now be discussed.

Delivering individual packages to individual customer's homes is an inefficient process compared to delivering whole batches of products to retail stores. This inefficiency is compounded further by the fact that customers are often not in to receive the delivery. Understandably, it is difficult for delivery companies to give a specific time when a customer's package will be delivered in fact, they *could* give specific times but this would make the system even more inefficient and therefore increase the cost even further. But it is equally understandable that customers are unwilling to wait in for a vaguely-specified time period often spanning several days to take receipt of their package.

The result is that the delivery company either leaves the parcel outside the customer's home which is clearly a security risk as it invites theft, or leaves a note explaining that they tried to deliver the package but the customer was not in; the delivery company will either try to deliver the package again or will ask the customer to collect it form the delivery company's depot between certain times which is inconvenient for the customer and inefficient for the delivery company.

In summary, the current process is inconvenient and inefficient. It is inconvenient for customers because they either have to try to wait in for the delivery which could mean waiting in for several days or go to the delivery depot at a certain time. It is inefficient for delivery companies because delivering single packages to individual customers' homes is more expensive than delivering multiple packages to retail stores, and because customers are often not in to receive their deliveries. The delivery companies' inefficiencies result in increased costs, which result in increased delivery fees. This limits further the appeal to customers of buying goods from an etailer.

Some customers have responded to this situation by arranging for goods purchased from etailers to be delivered to their employer's office. This approach has a number of problems, probably the most pertinent of which is that employers' office systems are not equipped to cope with handling their employees' shopping. Consequently, employers are becoming increasingly reluctant to allow their employees to deliver personal shopping to their place of work.

SUMMARY OF THE INVENTION

The invention provides a method and apparatus to implement and operate a network of automated collection points, or ACPs. The automated collection points facilitate the delivery of goods to a customer. In particular, the invention allows customers, delivery agents, or retailers to arrange for the delivery of goods ordered from a retailer to an automated collection point which can be accessed by a customer.

An automated collection point comprises a bank of electronically-operated lockers. The lockers may vary in size, and may be positioned indoors or outdoors. The ACP may include different type of interfaces, such as barcode readers, smart card readers, biometric scanners, or keypads.

The automated collection point is connected via a network medium to a collection of one or more servers referred to as a Locker Management System. A Locker Management System (LMS) may control two or more automated collection points. These automated collection points may be located at separate geographical locations.

In embodiments of the invention, rather than specifying home or work as the ship-to address, customers or etailers may arrange for goods to be shipped to a local ACP. In some embodiments, each package is assigned a unique numeric ID. When a package is delivered to an ACP site, it is identified to an interface on the ACP by its package ID. In some embodiments, the package ID may be embedded in the ACP site address on the ship-to label on the package. In some embodiments, the package ID may be encoded as a bar code on a label on the package—this bar code may be scanned on a bar code scanning interface coupled to the automated collection point. In other embodiments, the package ID may be transmitted wirelessly to a detector coupled to the automated collection point. In

yet another embodiment, the package ID may be typed into a keyboard in communication with the automated collection point. Upon validating the package ID, the automated collection point will open to permit access, so that the package may be placed into an appropriately-sized secure locker.

In embodiments of the invention, upon receipt of the package by the automated collection point, the customer will automatically be sent a message containing notification of the delivery. The message may include a numeric code for opening the locker. In embodiments of the invention, this code will only work when used in conjunction with a pre-determined customer PIN.

In embodiments of the invention, the customer will come to the ACP site to collect their goods. In alternative embodiments, the ACP may be affixed to the customer's residence. In embodiments of the invention, the ACP interface may prompt the customer to enter their collection code followed by their PIN. The collection code and PIN will be validated by the ACP site and the server computers used to manage the network of ACPs. If the validation is successful, the locker containing the customer's goods will open.

Embodiments of the invention include a method of arranging delivery of an item ordered from the Internet to a automated collection point by selecting one of a number of couriers. Such embodiments involve selecting a courier amongst a plurality of couriers. The plurality of couriers may be stored in a database accessible by the e tailer, either locally or remotely. The courier may be selected on the basis of price. In embodiments, the user is sent a plurality of prices for delivering the item to the collection point by the plurality of couriers. In some such embodiments, the system then selects the courier with the lowest price. The system may also determine whether or not couriers listed in the database deliver to the requested automated collection point.

In some embodiments, a string identifier may be sent from the e tailer to the customer via the web client. The string identifier may indicate an identifier for the courier; it embodiments, it may indicate a password for entry to the locker in the automated collection point. In some embodiments, the string identifier may be dynamically generated.

BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 is an entity-relationship diagram illustrating process employed for arranging the delivery of goods purchased from an e-tailer according to embodiments of the invention.

Fig. 2 illustrates a network architecture for a central server used to arrange the delivery of commercial goods purchased from e-tailers in embodiments of the invention.

Fig. 3 illustrates an client-side architecture used by e-tailers to interface with the central server according to embodiments of the invention.

Fig. 4 schematically illustrates client interfaces used by customers to access the central server according to embodiments of the invention.

Fig 5 illustrates a user interface for an automated collection point used in an embodiment of the invention.

Fig. 6 illustrates a client interface used by delivery companies to access the central server in embodiments of the invention.

Fig. 7 illustrates a client interface used by hosts of the automated collection points to access the central server according to embodiments of the invention.

Fig. 8 is a flowchart for a customer registration process used in embodiments of the invention.

Fig. 9, 9a, includes flowchart for a process for scheduling the delivery of goods according to embodiments of the invention.

Fig. 10, 10a, 10b includes flowcharts illustrating processes for delivering goods to an automated collection point according to embodiments of the invention.

Fig. 11, 11a illustrates flowcharts for processes involved in collecting goods.

Fig. 12, 12a includes a flowchart for a collection expiry process used in embodiments of the invention.

Fig. 13, 14 illustrates a partner settlement procedure according to embodiments of the invention.

Fig. 15 illustrates a process for automated closing of the door of an automated collection point according to embodiments of the invention.

Fig. 16 illustrates a process for delivery company registration with the central server according to embodiments of the invention.

Fig. 17 illustrates a process for registering a host for an automated collection point according to embodiments of the invention.

Fig. 18 illustrates a process for registering e-tailers with the central server according to embodiments of the invention.

Fig. 19 illustrates a system architecture with multiple courier servers.

Fig. 20 illustrates an address determination procedure for multiple courier embodiments.

Fig. 21 illustrates a delivery fee calculation procedure for multiple courier embodiments.

Fig. 22 illustrates a procedure for formatting shipping pages in multiple courier embodiments.

Fig. 23 illustrates a customer registration procedure used in multiple courier embodiments.

Fig. 24 illustrates a dynamic fee calculation procedure used in multiple courier embodiments.

Fig. 25 illustrates a ship order procedure used in multiple courier embodiments.

Fig. 26 illustrates a settlement procedure used in multiple courier embodiments.

Fig. 27 illustrates a system parameters procedure used in multiple courier embodiments.

Fig. 28 illustrates a schedule delivery procedure used in multiple courier embodiments.

Fig. 29 illustrates a redirect: home to CP procedure used in multiple courier embodiments.

Fig. 30 illustrates a system architecture in single courier embodiments.

Fig. 31 illustrates an address determination procedure used in single courier embodiments.

Fig. 32 illustrates a delivery fee calculation procedure used in single courier embodiments.

Fig. 33 illustrates a format shipping page procedure used in single courier embodiments.

Fig. 34 illustrates a customer registration procedure used in single courier embodiments.

Fig. 35 illustrates a dynamic fee calculation procedure used in single courier embodiments.

Fig. 36 illustrates a ship order procedure used in single courier embodiments.

Fig. 37 illustrates a settlement procedure used in single courier embodiments.

Fig. 38 illustrates a system parameters procedure used in single courier embodiments.

Fig. 39 illustrates a schedule delivery procedure used in single courier embodiments.

Fig. 40 illustrates a redirect: home to CP procedure used in single courier embodiments.

DETAILED DESCRIPTION

A. System Architecture

Embodiments of the invention include a computer network architecture for a locker management system used to operate one or more automated collection points. Each of the automated collection points comprises one or more lockers located at a site. The automated collection points provide an interface for validating the delivery of goods to the site. The processes employed in delivering goods to customers are schematically illustrated in Fig. 1. Each of the automated collection points is also coupled to the locker management system, which enables validation of packages arriving at the automated collection points.

A network architecture for the locker management system is illustrated in Figure 2-4, 6. The architecture includes one or more of the following components:

1. Internet Service Provider ISP 1004.
2. Leased Line 1001.
3. Web Server 1010
4. Application Server 1040
5. ACP Server 1070
6. Firewalls 1002 and 1030
7. Router 1003 and Ethernet network cabling
8. Hub 1099
9. Communication connection between the ACP Sites and the ACP Server. In an embodiment of the invention, the communication connection may be a VSAT Connection 1098

10. ACP Site 900

11. Host Interface Device 1110

12. Host Communication Device 1103.

13. Etailer Interface Device 301 Fig 3

14. Etailer Integration Device 310 Fig 3

15. Customer Interface Device 1201 Fig 4

16. Customer Message Device 1205 Fig 4

17. Delivery Company Interface Device 801 Fig 6

The ISP 1004 provides connectivity between the ACP system and the Internet. This connectivity is established by connecting the Web Server 1010 to the ISP 1004 through the Leased Line 1001 connected to a Router 1003. The Router 1003 is connected to the Hub 1099 via a Firewall 1002. The Web Server 1010 may be connected to the other servers in the ACP system using a CAT5 coaxial cable connection to the Ethernet Hub 1099. The Web Server 1010 hosts the web sites and performs the web processing required in the ACP system. The Web Server 1010 only communicates with the Application Server 1040 and other servers on the Internet via the ISP 1004; it does not communicate directly with the ACP Server 1070 – this is conducted through the Application Server 1040.

The Application Server 1040 also connects to the other servers through a CAT5 coaxial cable connection to the Ethernet Hub 1099, via a Firewall 1030. The Application Server 1040 performs most of the business logic in the ACP system. It works with the Web Server 1010 and ACP Server 1070 to send and receive information to users of the ACP System. The users are customers, etailers, delivery companies and ACP site hosts.

The ACP Server 1070 is the gateway through to the ACP sites. It is connected to the other servers through a CAT5 coaxial cable connection to the Hub 1099, and to the

ACP Sites via a connection medium that supports Internet Protocol IP communication. In an embodiment of the invention, this connectivity may be through a VSAT Connection 1098. The ACP Server communicates only with the Application Server 1040 and the ACP Sites 900; it does not communicate directly with the Web Server 1010 – this is conducted through the Application Server 1070 via the Hub 1099.

The ACP Site 900 is the actual bank of lockers to which customers' packages are delivered. The ACP Sites 900 communicate only with the ACP Server 1070. This communication can be conducted using any communication medium that supports IP. In the first implementation of this invention, this connectivity will be through a Communications Socket 1104 which will be a PES connector which will enable connectivity to the VSAT Connection 1098 at the ACP Server 1070.

Delivery companies relate to the system in two ways. First, their delivery personnel actually perform the delivery of the packages to the ACP Sites 900. This activity is conducted through the ACP Site 900 interface, which may comprise one or more of an LCD Screen 951, a Keypad 952, a series of Buttons 953 and a Barcode Reader 954 (Fig. 5). Secondly, the delivery company can view the information on deliveries made by their delivery personnel using the Delivery Company Interface 801. This is typically a web browser running on a PC owned by the delivery company. The delivery company will have access, through its web browser, to a dedicated part of the ACP system's Web Server 1010.

Hosts have a communications capability into which the ACP Sites are connected. As explained above, this communications capability can be anything that supports IP which, in the first implementation of this invention, will be a VSAT network. The host must therefore install a PES socket at the host site. The ACP Site i.e. the bank of lockers will connect to this PES socket.

Hosts are also able to connect to the ACP system to view information about deliveries made to the ACP Site 900 that they are hosting. This connection is done through a Host Interface Device 1110 (FIG. 7) which connects to the ACP system through the Web Server 1010. This Host Interface Device 1110 will typically be a web browser running on a standard PC owned by the host. The host will have access, through its web browser, to a dedicated part of the ACP system's Web Server 1010.

Etailers that are integrated into the ACP system do so through a connection to the ACP Server 1040. This is established through an Integration Device 310 residing on the etailer's system. This Integration Device 310 will typically be a computer program supplied as part of this invention, which runs on an etailer's server computer provided by the etailer. Etailers are also able to interface with the ACP system to view information about their relationship with the ACP system and past orders. This interface is conducted through the Interface Device 301, which will typically be a web browser running on a PC owned by the etailer. The etailer will have access, through its web browser, to a dedicated part of the ACP system's Web Server 1010.

Customers interface with the ACP system using an Interface Device 1201 owned by the customer. This will typically be a web browser running on a PC. The ACP system sends messages to customers using a Message Device owned by the customer. This will typically be an email account, cellular phone or pager.

Detail of each part of the system architecture

The system architecture for a first embodiment of the apparatus and method of the present invention is illustrated in figures 2 through 7. In a preferred embodiment, the apparatus of the present invention comprises Central Servers 1000 which connects to ACP

Site 900, Host 1100, Customer ~~600~~ 1200, Delivery Company 800 and Etailer 700. The system architecture for each of these components will now be discussed.

Central Servers 1000

Figure 2 illustrates the Central Servers 1000, which comprise a Web Server 1010, Application Server ~~1030~~ 1040 and ACP Server ~~1090~~ 1070. In a preferred embodiment of this invention, each server will physically reside on its own dedicated machine. A conventional server with sufficient storage, memory and processing capability will be sufficient for each of these machines.

Central servers connect to each other over an internal 10/100 Ethernet network. Each server has a conventional Ethernet Network Interface Card NIC, which is connected to an Ethernet Hub 1099 using standard Category 5 CAT5 cable.

At a high-level, the Web Server 1010 controls the interface between the World Wide Web and the Application Server 1040, the Application Server 1040 performs the business logic, and the ACP Server 1070 controls the interaction with the ACP sites 900. The detailed role of each server will now be discussed.

Web Server 1010

The purpose of Web Server 1010 is to host the web sites that are used to manage the flow of information between other Central Servers 1000 and external devices used by other participants in the process. These participants are Customers ~~600~~ 1200, Hosts 1100, Delivery Companies 800, and Etailers 700. The Web Server 1010 has only a minimal amount of business logic – its main role is to provide an interface to the data and business logic of the Application Server 1040.

Web Server 1010 is connected to the Internet. This connection can be arranged with any standard Internet Service Provider ISP 1004 and will include a Leased Line 1001.

The Leased Line 1001 is a physical connection between the Web Server 1010 and the ISP's 1004 server. The Leased Line 1001 terminates at the server room of the Central Servers 1000 through a communications socket which feeds into a Router 1003. The Router 1003 can be any commercial router compatible with the configuration of the Leased Line 1001. In the first implementation of this invention, a Cisco 804 router will be used for this purpose. Other equivalents will be apparent to those skilled in the art.

The speed requirements for the Leased Line 1001 will depend on the volume of traffic going between Customers' 600 1200 Interface Devices 1201 and Web Server 1010. In a first installation of this invention, a 256kpbs leased line will be sufficient.

A Firewall 1002 should be installed between the Web Server 1010 and the Leased Line 1001. The purpose of the Firewall 1002 is to protect the Web Server 1010 and therefore all Central Servers from unwanted intrusions via the Internet. As a minimum, the firewall it configured to allow traffic through on ports "443" Secure System Layer and "80" web traffic. Other ports maybe allowed if remote monitoring by system support personnel is required. Similarly, the Web Server 1010 it configured to listen on ports "443" and "80," along with any other ports required for remote support.

A second Firewall 1030 should be installed between the Web Server 1010 and the Ethernet Hub 1099. This is to provide further protection to the Application Server 1040 and the ACP Server 1070 should an intruder manage to break through the first Firewall 1002. Firewall 1030 is also used by Application Server 1040 when making external connections not via the Web Server 1010.

The Web Server's 1010 Application Software 1011 is a set of computer programs. The scope of these computer programs is restricted to displaying information on web pages, receiving and validating responses from users customers, delivery companies, administrators, etailers and hosts and passing these responses down to the Application

Server 1040 via the Firewall 1030. The Application Server's 1040 responses will be fed back up to the Web Server 1010 via the Firewall 1030. The appropriate Application Software 1011 will manage the displaying of the response on the web site.

The Application Software 1011 computer programs can be coded in any language or combination of languages that is capable of displaying web pages on the World Wide Web and that can communicate, through Firewall 1030, with the Application Server 1040.

In an implementation of this invention, the computer programs may be coded in HTML with a combination of static graphics, such as JPEG files, as well as animated graphics, such as animated GIFs. These computer programs are organised into five sets of modules: Customer Interface 1012, Etailer Interface 1013, Delivery Company Interface 1014, Site Host Interface 1015 and Administration Interface 1016.

Customer Interface 1012 manages the web-based interaction between customers who are arranging for goods to be delivered to an ACP site. The functionality of the Customer Interface 1012 will be to display the information described in REGISTER 100 (Fig. 8) and SCHEDULE DELIVERY ~~300~~ 200 (Fig. 9, 9A). Customer Interface 1012 will also provide the interface through which customers can change their details specified in REGISTER 100, as well as displaying information about previous deliveries, such as date of delivery and collection code.

Etailer Interface 1013 enables registered etailers to access and analyse information about goods that were delivered from them to an ACP site resulting from a customer purchase. This information will be browse only. Delivery Company Interface 1014 enables registered delivery companies to access and analyse information about goods that were delivered by them to an ACP site. This information will be browse only. Site Host Interface 1015 enables ACP site hosts to access and analyse information about goods that were delivered to their ACP sites. This information will be browse only.

Administrator Interface 1016 will be used by ACP support personnel to administrator the ACP infrastructure. Tasks include adding and deleting site hosts and accessing customer details. The Administrator Interface 1016 will allow information to be accessed in browse, add, change and delete modes, depending on the security profile of the user.

In order to interface with the Web Server's 1010 hardware, the Application Software 1011 requires some System Software 1017. Specifically, an Operating System 1018 it installed on the Web Server 1010. This can be a conventional server operating system. The main stipulation is that a compiler for this operating system must exist for the language in which the Web Server's 1010 Application Software 1011 is coded. In the first implementation of this invention, Microsoft's Windows NT operating system will be used.

Web Server 1010 will have a conventional hard-disk (1023) magnetic or optical Storage Device 1022 arranged in a Random Array of Inexpensive Disks RAID configuration. No business data will be stored on this unit – all business data will be stored on the storage unit of the Application Server 1040. The only data that will be stored on the storage device of the Web Server 1010 will be the Operating System 1018 and the Application Software 1011.

Description of the Application Server 1040

The role of the Application Server is to process the information received from the Web Server 1010 and from the ACP Server 1070. Users cannot interface directly with the Application Server 1040; rather, users access the application server 1040 via the Web Server 1010. Like the Web Server 1010, the Application Server 1040 has an Application Software ~~1041~~ layer. This Application Software ~~1041~~ is a set of computer programs. These programs can be coded in any language or combination of languages that supports

interfacing with the Web Server 1010 via the Firewall 1030. The programming language also support interfacing with a Relational Database Management System RDBMS, 1050. In the first implementation of this invention, the Application Software 1041 programming language will be Microsoft's Visual Basic with some C++ extensions.

The Application Software ~~1041~~ computer programs are organised into five sets of modules: Customer Processing 1042, Etailer Processing 1043, Delivery Company Processing 1044, Host Processing 1045 and Administration Processing 1046.

Customer Processing 1042 provides the customer-related business logic to support the REGISTER 100, SCHEDULE DELIVERY 200 and COLLECTION 400 processes. The Customer Process 1042 also contains the logic to maintain customer's details through the Customer Interface 1012.

Etailer Processing 1043 provides the etailer-related business logic to support the SCHEDULE DELIVERY 200 and PARTNER SETTLEMENT 600 (FIG. 13) processes, as well as the database access and data manipulation for the Etailer Interface 1013.

Delivery Company Processing 1044 provides the delivery company-related business logic to support the DELIVER 300 (FIG. 10) and PARTNER SETTLEMENT 600 processes, as well as the database access and data manipulation for the Delivery Company Interface 1014.

Host Processing 1045 provides the host-related business logic to support the PARTNER SETTLEMENT 600 process, as well as the database access and data manipulation for the Site Host Interface 1014.

Unlike the Web Server 1010, the Application Server 1040 requires a Database 1050 to store business data. Any commercial Relational Database Management System RDBMS 1051 should be sufficient for this purpose, although an ODBC compliant

database is preferred. The first implementation of this invention uses Microsoft's SQL Server RDBMS.

This business data stored on the RDBMS 1051 can be grouped into six databases: Customers 1052, Etailers 1053, Delivery Companies 1054, Hosts 1055 and Orders 1056.

Customers 1052 holds information about customers that was initially captured during the REGISTER 100 process. This information includes name, email address and contact telephone number, as well the customer's list of preferred ACP sites.

Etailers 1053 holds information about registered etailers. This includes the details of the etailer's financial arrangement within the ACP process.

Delivery Companies 1054 holds information about registered delivery companies. This includes the details of the delivery company's financial arrangement within the ACP process.

Hosts 1055 holds information about ACP site hosts. This includes the site's address as well as the details of the site host's financial arrangement within the ACP process.

Orders 1056 holds information on every order that is processed through an ACP site. Details include the date of delivery, the parcel ID, the collection code, the customer, the etailer if registered, the delivery company if registered and the site host.

The Application Server 1040 needs to communicate with other devices outside the Central Servers 1000 network, but not via the Web Server. These processes includes the Embedded Etailer Link 1048, the Customer Messaging 1049 and the Financial Settlement 1047. To protect the Central Servers 1000, this communication is conducted via a firewall. The Firewall 1030 can be used for this purpose, shared with the Web Server 1010.

The Embedded Etailer Link 1048 is a computer program provided by the ACP service to registered etailers. The Embedded Etailer Link 1048 is integrated into the

Etailer's web site and is invoked by the customer by pressing the button on the Etailer's site that is associated with the Embedded Etailer Link 1048. The Embedded Etailer Link 1048 controls the communication between the registered etailer's site and the Application Server 1040. This supports the SCHEDULE DELIVERY 200 process for registered etailers.

The Customer Messaging Link 1049 manages the communication between the Application Server 1040 and the customer. The Customer Messaging Link 1049 currently supports communicating via email, text-to-voice over standard telephone or cell phone, and text messaging using Short Message Service SMS on cell phones. Customers can choose over which medium they would like to be communicated during the DELIVER 300 process (Fig. 10) sending customers their collection codes when their goods are delivered, and COLLECTION ~~ORDER~~ EXPIRY ~~600~~ 500 process (Fig. 12) reminding customers to collection their goods and inform them when their order has expired.

As well as enabling access to information, the Etailer Processing 1043, Delivery Company Processing 1044 and Host Processing 1045 modules manage the financial relationships between all parties in the ACP network. Settling the financial positions requires access to third-party servers outside the Central Servers 1000 network. Also, taking payments from customers for late collection COLLECT 400 process (Fig. 11, 11A) requires access to third-party networks such as the VISA credit card clearing network. Access to all external financial networks is managed by the Financial Settlement Link 1047.

To run the Application Software ~~1041~~ on the Application Server 1040, some System Software 1060 it installed on the Application Server 1040. This System Software 1060 includes an Operating System 1061, as well as any other system monitoring or performance tuning software required to maintain and support the Application Server ~~1041~~ 1040. The Operating System 1061 can be any commercial server operating system,

providing a compiler is available for the language in which the Application Software ~~1041~~ is written. In the first implementation of this invention, the Operating System 1081 to be installed on the ACP Server 1070 will be Microsoft's Windows NT.

The Processing Unit 1065 will contain conventional processing apparatus including a Central Processing Unit CPU 1066 and Memory 1067 – both Random Access Memory RAM and Read Only Memory ROM.

The Storage Device 1068 will be conventional Hard Disk 1069 magnetic or optical storage units arranged in a Random Array of Inexpensive Disks RAID configuration, or other secondary storage systems apparent to those skilled in the art.

The Application Server could be split into three separate servers: an Application Server to run the Application Software ~~1041~~, a Database Server dedicated to running the RDBMS 1051, and a File Server dedicated to serving any files that may be required to administer the service for example, word processing documents or spreadsheets. The Application Server should have a fast processor and average amount of RAM. The Database Server should have a fast processor, a lot of RAM, and a RAID array of hard-disks with enough capacity to hold all the business information. The File Server should have an average processor with a lot of RAM. Subsequent implementations of this invention might take this approach, which should result in faster performance at high volumes.

The ACP Server 1070

The ACP Server 1070 manages the communication between each ACP Site 900 and the Application Server ~~1070~~ 1040. The ACP Server has an Application Software 1071 layer. The Application Software 1071 contains the Locker Management System 1072. The Locker Management System 1072 responds to messages from Application Server 1040

(Fig. 10, 10A, 10B)

and the ACP Sites 900 to perform the functions specified in DELIVER 300, COLLECT 400 (Fig. 11, 11A) and ~~ORDER~~ COLLECTION EXPIRY ~~600~~, 500 (Fig. 12).

All communication is asynchronous between the ACP Server 1070 and the Application Server 1040, and the ACP Server and the ACP Sites 900. This is to ensure that the entire ACP system can continue to function for a reasonable period in the event of a communication breakdown. For example, if a communication failure occurred between the ACP Server 1070 and the ACP Sites 900, then the ACP Sites 900 would still be able to perform the DELIVER 300 and COLLECT 400 processes. The messages would simply be stored at the ACP Site 900 and would be re-sent automatically once the communication had been re-established. If the communication were synchronous which it isn't then the ACP Site 900 would be out of action until the communication problem had been fixed.

Unlike the Application Server 1040, the Locker Management System has a series of screens which are used to monitor and maintain the ACP Sites 900. As well as responding reactively to requests from Application Server 1040 and ACP Sites 900, the Locker Management System 1072 routinely conducts proactive checks on each ACP Site 900 (Fig. 5). The status of each ACP Site 900 down to the level of individual Lockers 970 is established and a warning is displayed on the Locker Management System 1072 screen to alert support personnel of the problem.

The Locker Management System 1072 can be coded in any programming language that supports communication with the Application Server 1040, the ACP Sites 900 and the ACP Server's 1070 RDBMS 1076. In the first implementation of this invention, the Locker Management System will be programmed in Java.

The ACP Server 1070 requires a Database 1075. The Database 1075 will be an RDBMS 1076 and can be any commercial RDBMS that is able to communicate with the

Locker Management System 1072. In the first implementation of this invention, the Database 1075 will be built using Microsoft's SQL Server RDBMS product.

The data stored on the RDBMS 1076 can be grouped into Locker Details 1077 and Pending Messages 1078. Locker Details 1077 stores information on the configuration of all ACP Sites 900. Pending Messages 1078 contains information on deliveries or collections. These messages are from both the ACP Sites 900 and the Application Server 1040 that are destined for each other. The messages are only deleted from the Database 1075 once the ACP Server 1070 has confirmation of receipt from the target server.

To run the Application Software 1071 on the ACP Server 1070, some System Software 1080 it installed on the ACP Server 1070. This System Software 1080 includes an Operating System 1081, as well as any other system monitoring or performance tuning software required to maintain and support the ACP Server 1070. The Operating System 1081 can be any commercial server operating system, providing a compiler is available for the language in which the Locker Management System 1072 is written. In the first implementation of this invention, the Operating System 1081 to be installed on the ACP Server 1070 may be Microsoft's Windows NT ™. Other suitable operating systems will be apparent to those skilled in the art.

The Processing Unit 1085 will contain conventional processing apparatus including a Central Processing Unit CPU 1086 and Memory – both Random Access Memory RAM and Read Only Memory ROM 1087.

The Storage Device 1090 will be conventional Hard Disk 1091 magnetic or optical storage units arranged in a Random Array of Inexpensive Disks RAID configuration.

The ACP Server 1070 connects directly to the Ethernet Hub 1099 using standard CAT5 cable. However, the ACP Server 1070 connects remotely to the ACP Sites 900, because the distance between the ACP Sites 900 and the ACP Server 1070 is too far to

implement a direct connection. The physical communication medium used to connect the ACP Server 1070 with the ACP Sites 900 can be anything that supports the TCP/IP protocol. In the first implementation of this invention, the communication medium will be 2-way VSAT. Other communication media will be apparent to those skilled in the art.

The VSAT connectivity may be implemented by connecting the Hub 1099 to a VSAT Connection 1098. The ACP Server will send messages via the Hub 1099 over the VSAT network to the ACP Sites 900.

The communication between the ACP Server 1070 and the ACP Sites 900 does not have to be point-to-point. Instead, the communication could be conducted over the Internet via a connection between the ACP Sites 900 and an Internet Service Provider ISP. The ACP Sites 900 could simply use a modem and a Plain Old Telephone System POTS connection to dial-up the ISP.

B. Description of the Etailer 700

In the context of this invention, an Etailer 700 (FIG. 3) is a company that sells products through an online medium rather than through a physical store. In an embodiment of the invention, there are two types of Etailers: registered and non-registered. Registered Etailers 700 have a relationship with the ACP network and integrate directly with the Application Server 1040; non-registered Etailers have no relationship with the ACP network.

Non-registered Etailers do not require any apparatus to participate in the ACP network because their Customers ~~400~~ 1200 may perform the ACP processing, as illustrated by a decision point 202 in the SCHEDULE DELIVERY 200 process illustrated in Figure 9.

Registered Etailers 700 employ an Interface Device 301 (FIG. 3) to view information on orders sent by them to ACP Sites 900. In an embodiment of the invention, the Interface

Device 301 may be a Web Browser 302 running on a conventional PC or server. This Web Browser will be used to access the ACP web site hosted on Web Server 1010 to view the Etailer's 700 information. Other embodiments of this invention may support interfacing through other web-enabled devices such as cellular phones, personal organizers, televisions and radios.

Registered Etailers 700 also employ an Integration Device 310. This Integration Device will host the Embedded Etailer link 1048 (Fig. 2) that integrates the Etailer 700 with the Application Server 1040.

C. Description of the Customer ~~400~~ 1200

In the context of this invention, a Customer ~~400~~ 1200 is a person who buys goods from an etailer. However, embodiments of this invention also support use by customers who purchase goods from mail order companies.

To use the ACP network, a customer employs an Interface Device ~~401~~ 1201 and a Message Device ~~405~~ 1205 (Fig. 4). The Interface Device ~~401~~ 1201 is used by the Customer ~~401~~ 1200 to access the Web Server 1010. This interaction is illustrated by the flowcharts for the REGISTER 100 process in figure 8 and SCHEDULE DELIVERY 200 process in figure 9. In an embodiment of this invention, the Interface Device ~~401~~ 1201 may be a Web Browser ~~402~~ 1202 running on a conventional personal computer PC. This Web Browser will be used to access the ACP web site hosted on Web Server 1010 to perform the REGISTER 100 and SCHEDULE DELIVERY 200 functions. Other embodiments of this invention may support interfacing through other web-enabled devices such as cellular phones, personal organizers, televisions and radios.

The Message Device ~~405~~ 1205 is used by the Application Server 1040 to send messages to Customers ~~400~~ 1200. This process is illustrated in the DELIVER 300 function in Figures 10

10a 10b and the COLLECTION EXPIRY 500 function in Figure 12. In an embodiment of the invention, this Message Device can be either a conventional Email ~~406~~ 1207 account or a Cellular Phone ~~407~~ 1206 that supports a Short Message Service SMS.

D. Description of the ACP Site 900 figure 5

The ACP Site 900 is a bank of Lockers 970, situated inside or outside a Host's 1100 building. The Lockers 970 are in a range of sizes. The Lockers 970 are managed by a central console 901 OR "L100". In embodiments of the invention, the central console 901 has a user interface which may include one or more of the following: an LCD screen 951, a series of metal Buttons 953 to the left and right of the screen, an electronic numeric Keypad 952 and a Barcode Reader 954. The lockers are operated entirely electronically using the Buttons 953, the Keypad 952 and the Barcode Reader 954; no mechanical keys are involved. The central console may also have the ability to integrate with a credit card reader, cash receiver, or a printer. In some embodiments, the device does not include a keypad.

The Lockers 970 are locked and unlocked using electronic locking devices which respond to signals from the Processing Unit 918. The locking devices can be any door-locking devices capable of being controlled electronically by a CPU.

The Processing Unit 918 contains a motherboard with a CPU 919 and memory. The CPU 919 can be any CPU capable of being programmed to operate the locking devices and communicate with the Locker Management System 1072. In an embodiment of this invention, the Motorola 6088 processor will be used. Other embodiments will be apparent to those skilled in the art.

In embodiments of the invention, two types of memory are employed: Read Only Memory ROM 920 and Random Access Memory RAM 921. ROM 920 stores the System

Software 915 and Application Software 912, but cannot be modified by the System Software 915 or Application Software 912. So in addition to ROM 920, some RAM 921 is used by the System Software 915 and Application Software 912 to store details of locker status and store messages received from the Locker Management System 1072. Solid state memory i.e. RAM is preferred to a hard-disk or any other storage device containing moving parts. This is because the ACP Site will be in unattended as well as attended situations which may result in the ACP Site being jostled: moving-part storage could malfunction in this environment.

The data stored in RAM 921 can be grouped into three areas: Locker Status 933, Order Details 934 and Delivery Company Details 935. Locker Status 933 contains the current status of each Locker 970. Order Details 934 contains collection code and PIN information. Delivery Company Details contains details of delivery companies such as logon ID who are registered to use the ACP Site ~~1070~~ 900.

The Locker Management System 1072 performs frequent checks on each central console 901 to determine the status of its Lockers 970. These checks are performed every few seconds. In the event of a central console 901 crash, when the central console 901 is re-booted it will re-establish its connection to the Locker Management System. However, re-booting the central console 901 will result in losing the contents of its RAM ~~920~~ 921. The central console 901 will therefore ask the Locker Management System 1072 to re-populate its RAM ~~920~~ 921 with the contents at the time of re-boot.

Application Software 912 is required to control the central console 901. The Application Software 912 is called central console Software 913. The CENTRAL CONSOLE Software 913 is a collection of computer programs. The computer programs can be written in any language or collection of languages capable of running on an Operating System 916 that contains an Internet Protocol IP stack. In the first

implementation of this invention, MicroWare's OS/9 operating system will be used. Other equivalents will be apparent to those skilled in the art. The functional requirements of the CENTRAL CONSOLE Software 913 are detailed in the DELIVER 300, COLLECT 400 and ~~ORDER~~ COLLECTION EXPIRY ~~600~~ 500 processes.

The CENTRAL CONSOLE 901 also contains a Network Interface Card NIC 921. This NIC 921 can be any 10/100 Ethernet NIC. The NIC is required to establish connectivity with the Locker Management System 1072. This connectivity can be conducted using any medium that supports the TCP/IP protocols. An implementation of this invention may be conducted using 2-way VSAT. The NIC 921 that comes out of the CENTRAL CONSOLE 901 will be connected to a standard VSAT PES connector 1104 residing at the host ACP Site 900.

The communication between the Locker Management System 1072 and the central console 901 could also be conducted over the Internet via a connection between the ACP Sites 900 and an Internet Service Provider ISP. The ACP Sites 900 could simply use a modem and a Plain Old Telephone System POTS connection to dial-up the ISP.

E. Description of the Delivery Company 800

In the context of this invention, a Delivery Company 800, as illustrated in Fig. 6, is a company that delivers parcels from Etailers 700 to Customers ~~400~~ 1200. This invention involves Delivery Companies 800 delivering to an ACP Site 900 rather than to a Customer ~~400~~ 1200. No apparatus is required for the Delivery Company 800 to operate the ACP Site 900 – refer to Deliver 300 (Fig. 10, 10A, 10B) for an explanation of this process.

In embodiments of the invention, the Delivery Company 800 is able to view information about the deliveries they have performed refer to Delivery Company Interface

(Fig.2)
1014 in Central Servers 1000. To do this, the Delivery Company requires an Interface Device 801. In the first implementation of this invention, the Interface Device 801 it a Web Browser 802 running on a conventional PC. This Web Browser will be used to access the ACP web site hosted on Web Server 1010 to view the Delivery Company's 800 information. Embodiments of this invention may support interfacing through other web-enabled devices such as cellular phones, personal organizers, televisions and radios.

F. Description of the Host 1100

In the context of this invention, a Host 1100, as illustrated in Figure 7, is an organization that places an ACP Site 900 either inside its building or outside. If the ACP Site 900 is outside, it will be surrounded with a protective shell.

The only apparatus required by the Host 1100 is a Communications Device ~~1101~~ 1103 to enable the central console 901 to communicate with the Locker Management System 1072. (Fig.2) In an embodiment of this invention, this Communications Device ~~1102~~ 1103 may be a VSAT PES. 1104

The Host 1100 will also require an Interface Device 1110 if it would like to access the information about the deliveries made to its ACP Site 900--see Host Interface 1015 (Fig.2) for details of this information. In an embodiment of this invention, the Interface Device 1110 may be a Web Browser 1111 running on a conventional PC or server. This Web Browser 1111 will be used to access the ACP web site hosted on Web Server 1010 to view the Host's 1100 information. Future embodiments of this invention will support interfacing through other web-enabled devices such as cellular phones, personal organizers, televisions and radios.

G. Process Flow of the Invention

Figure 8 illustrates a flowchart for a process flow in the present invention, in which delivery of remotely purchased goods is scheduled and made to any one of a network of Automated Collection Points ACPs, with the Central Servers 1000s managing the process. The Customer ~~400~~ 1200 first Registers 100 for the service by logging on to the web server and providing contact details. In embodiments of the invention, these contact details may include a Personal Identification Number PIN. At some subsequent time the Customer ~~400~~ 1200 then buys goods from an Etailer 700. When asked for the delivery address the Customer ~~400~~ 1200 then Schedule a Delivery 200 (FIG. 9, 9A) at their preferred ACP Site 900; the Central Servers 1000 assigns the goods a unique Package ID. The goods are then Delivered 300 (FIG. 10, 10A, 10B) to the ACP Site 900 and put into a secure locker by the deliverer using the Package ID. Once the door is shut the ACP contacts the Central Servers 1000s, which then contacts the Customer ~~400~~ 1200 telling them that their goods have arrived and giving them a Collection Code for that order. At his own convenience the Customer ~~400~~ 1200 then visits the ACP Site 900 and Collects his Goods 400 (FIG. 11, 11A) from the locker using his PIN and the Collection Code associated with the package. At the end of every month the Central Servers 1000 analyses all deliveries and arrange for monetary settlement to take place between all involved parties in Partner Settlement 600 (FIGS. 13, 14).

List of Processes of the Invention

Process	Description
Register 100	How customers register with the ACP system

Schedule Delivery 200	How customers arrange for a purchase to be delivered to an ACP site
Deliver Goods 300	How the deliverer interfaces with the ACP site to put the customer's purchase into an available locker, as well as how customers are informed that their purchase is ready for collection
Collect Goods 400	How customers interface with the ACP site to collect their purchases
Collection Expiry 500, 530	What happens when customers do not collect their purchases from the ACP site for the pre-defined time period
Partner Settlement 600	How payments are administered between etailers, hosts and delivery companies
Close Doors 1300	How open lockers can be shut and locked
Delivery Company Registration 1400	How delivery companies register with the ACP system
ACP Host Registration 1500	How ACP hosts register with the ACP system

Etailer Registration 1600	How etailers register with the ACP system

H. Descriptions of the Processes of the Invention

Note: some of the Figures that are referenced in the following process flow descriptions make reference to the web site "ByBox.com". This is an example name for the web site that is hosted by the Web Server 1010; it is simply easier for the reader to give the web site an example name than to keep referring to it as "the ACP web site".

Register 100

With reference to FIG. 8 there is described the process by which the Customer ~~400~~ 1200 registers. At step 101 the Customer ~~400~~ 1200 establishes a connection to the Application Server using a Customer ~~400~~ 1200 modem. In one embodiment the Central Servers 1000, has a page on the world wide web and access to the Application Server is through a dedicated web server. In such an embodiment the Customer ~~400~~ 1200 provides information through the interface of conventional web browser software such as Microsoft Internet Explorer ™. At step 102 the Customer ~~400~~ 1200 provides details to register for the service. These include email address, phone numbers including cellular and home address. Email is the primary communication medium for the service and at step 103 the email address is validated to

check for correct syntax. At step 104 the Customer 1200 is prompted to add a correct address if his original entry is invalid.

Once all the Customer 1200's contact details have been entered successfully step 105 prompts the Customer 1200 to create a password for future access to their account data. This it a minimum of eight characters long. If (106) an invalid password is entered step 107 prompts the Customer 1200 to re-enter. Step 108 then asks the Customer 1200 to specify their preferred communication method. As soon as goods are delivered to the ACP Site 900 and put in a locker the Central Servers 1000 sends a message to the Customer 1200 informing them that their goods have arrived. The communication channel used for this message is selected using the Customer 1200's preference: email, telephone, post. Step 109 then prompts the Customer 1200 to build a list of preferred ACP Site 900s. After comparing addresses, such as home and office, with the network of ACP Site 900s the Customer 1200 must elect preferred ACP Site 900s. Step 110 then asks the Customer 1200 to specify a Personal Identification Number PIN. This is a four character numeric string that is used to identify the Customer 1200, as opposed to their package, as part of the Collect Goods process 400.

Once all details have been added and validated, step 111 updates the Customer 1200's account on the Application Server, assigns a Customer 1200 ID and writes a cookie to the Customer 1200's device providing a fast link to the Customer 1200's details on the Application Server.

As soon as the Customer 1200 has registered for the service he is able to order goods online and specify an ACP Site 900 as the delivery address. The Schedule Delivery process 200 describes how a Customer 1200 uses the Application Server to arrange delivery to the prescribed ACP Site 900 using the Etailer 700 web-site. There are two discrete paths available based on whether the Etailer 700 provides access to the Application Server from

their web-site. In cases where such a link exists the Etailer 700 is referred to as registered; where no such link exists they are described as non-registered.

Schedule Delivery 200

FIG. 9 describes how a registered Customer 1200 ~~400~~ can schedule a delivery to an ACP Site 900. To make use of the service the Customer 1200 ~~400~~ must first order goods from an Etailer 700. At step 201 the Customer 1200 ~~400~~ goes to the Etailer 700 site and selects the goods required. As part of the purchase transaction the Etailer 700 will ask the Customer 1200 ~~400~~ to specify (203) the address to which the goods should be delivered. If (202) the Etailer 700 is registered there will be a button on the delivery address page of the Etailer 700 site that will link directly to the Application Server. At step 204 the Customer 1200 ~~400~~ presses this button and at step 205 a program embedded in the Etailer 700 site, executes and looks for the cookie written to the Customer 1200 ~~400~~'s device as part of Register 100. In step 206 if no cookie is found the Customer 1200 ~~400~~ is taken (207) to the service's main web-page where they are asked to log-in, using their email address and password, or Register 100. If (208) the Customer 1200 ~~400~~ logs-in successfully the cookie is re-written to their device. If they register for the first time, a new cookie is written as described in Register 100. If the Customer 1200 ~~400~~ does not register or log-in they are taken back to the Etailer 700 site where they are able to specify a non-ACP delivery address.

At step 209 the Customer 1200 ~~400~~ will have a cookie on their device containing their Customer 1200 ~~400~~ ID. The executing program now looks up the Customer 1200 ~~400~~'s account on the Application Server using this Customer 1200 ~~400~~ ID and finds their ACP Site 900 preferences, set-up as part of Register 100. In step 210 the Customer 1200 ~~400~~ is asked to select the ACP Site 900 for this delivery from his list of preferences. Once a site is chosen the

Application Server then generates a Parcel ID unique to this particular delivery. If the Etailer 700 has specified bar-code extraction as part of Etailer 700 Registration 1600, then, at step 213, the tracking number, generated by delivery company software at the Etailer 700 site, is converted into a bar-code and added to the package label. Then the address field on the Etailer 700 site is completed with the ACP Site 900 address, Package ID and text identifying the package as bar-code enabled. At step 214, if the Etailer 700 cannot process bar-code encryption the Parcel ID is printed as a numeric string as part of the delivery address.

Once the delivery address is complete the Customer 400 completes the purchase transaction at step 215. Once the order is validated by the Etailer 700 , a message is sent to the Application Server confirming that an order was placed for that Parcel ID and giving further details relating to that order: Etailer 700 ID, from Etailer 700 Registration 1600, the number of items in the order and the time and date of the order timestamp. The message is used by the Application Server to determine which Parcel IDs represent confirmed deliveries; if the Customer 400 selects an ACP Site 900 but then cancels the purchase transaction then a Parcel ID would be generated but not used.

If the Etailer 700 is not bar-code enabled this completes the Schedule Delivery process. The numeric Parcel ID is not downloaded to the CENTRAL CONSOLE and there is not exact validation of the Parcel ID when a delivery is made. Instead check-digit validation is used to provide rudimentary validation. However, for bar-coded deliveries the Etailer 700 must pass bar-code details back to the Application Server so that they can be passed on to the CENTRAL CONSOLE for validation on delivery. In steps 228 and 229 the Etailer 700 collates the bar-code with the Parcel ID, ACP address and ACP Site 900 ID for the order and then sends this to the Application Server in step 230. This process is completed every 30 minutes, with orders being batched together. In step 231 the

Application Server then sends the bar-code and associated Parcel ID to the ACP server which then uses the site ID to identify the relevant ACP Site 900 and then download (232) the bar-code and Parcel ID to the local CENTRAL CONSOLE. At this point the ACP Site 900 is ready to receive that delivery.

If the Etailer 700 is non-registered there will be no integration between their site and the Central Servers 1000. As a result the selection of the appropriate ACP Site 900 together with the generation of the Parcel ID it done independently from the Etailer 700 web-site. In step 217 the Customer ~~400~~ 1200 goes to the service's home-page on the world wide web and clicks on the 'use service' button. In step 218 the Customer ~~400~~ 1200's device is searched for the cookie written as part of the Register 100 process. If a cookie is found the Customer ~~400~~ 1200 goes directly to step 221. Otherwise, if no cookie is found, the Customer ~~400~~ 1200 is asked to either Register 100 or log-on using their email address and password. If the Customer ~~400~~ 1200 logs-on the cookie is re-written to their device as part of step 219. If (220) the Customer ~~400~~ 1200 completes the Register 100 process a new cookie is written to their device.

In step 221 the Application Server looks up the Customer ~~400~~ 1200's ACP Site 900 preferences using their Customer ~~400~~ 1200 ID retrieved from the cookie. In step 222 the Customer ~~400~~ 1200 selects the ACP Site 900 preferred for this delivery and then in step 223 the Application Server generates a Parcel ID unique to that delivery. In steps 224 and 225 the Customer ~~400~~ 1200 copies the ACP Site 900 address and the Parcel ID into the address fields of the Etailer 700 's delivery page and completes the purchase transaction (226).

Deliver Goods 300

Once goods have been ordered they it dispatched to the ACP Site 900 ready for collection by the Customer ~~400~~ 1200. FIG. 10 describes this process.

After the Customer ~~400~~ 1200 has completed the purchase transaction the Etailer 700 packages the goods (301) and labels with the ACP Site 900 address and Parcel ID. Using their own, or a third party, delivery company the goods are then dispatched to the ACP Site 900 in step 302.

When at the ACP with the package the deliverer approaches (303) the screen of the CENTRAL CONSOLE where he is first asked to identify himself in step 304. If, as part of Delivery Company Registration 1400, his company has elected to use bar-code identification the deliverer can present his membership card to the bar-code reader; otherwise he enters his Delivery Company ID using the numeric keypad. In step 305 the CENTRAL CONSOLE validates the Delivery Company ID against its locally held database of valid codes. If the code is valid (306) the CENTRAL CONSOLE proceeds to step 308 and displays the Delivery Main Menu, otherwise the delivery is refused in step 307 and the CENTRAL CONSOLE prompts the deliverer to enter a valid code.

At step 308 the deliverer is presented with four options: 'delivery', 'expiry', 'close doors' and 'exit'. To make a delivery he selects 'delivery' and the CENTRAL CONSOLE then prompts him (309) to either enter the Parcel ID for the package or present the bar-code for scanning. If (310) the package address contains text telling the deliverer that the package is bar-code enabled he will then present the package to the bar-code reader of the CENTRAL CONSOLE in step 315. If the package is not bar-code enabled, or (316) the bar-code reader is unable to read the bar-code the deliverer is prompted, in step 311, to enter the Parcel ID using the keypad. At step 317, if (312, 313) the Parcel ID entered is invalid the CENTRAL CONSOLE informs the deliverer and re-displays the Delivery Main Menu.

Once a valid bar-code or Parcel ID is entered the CENTRAL CONSOLE opens the smallest available locker (314) and prompts the deliverer to place the goods inside (319). In step 320 the CENTRAL CONSOLE checks to see if the door to the locker has been closed. If it has

the CENTRAL CONSOLE automatically locks the door and asks the deliverer if the delivery was successful in step 326. If the locker door is still open and more than 30 seconds have elapsed since the door was opened the CENTRAL CONSOLE beeps and the screen flashes for 10 seconds, prompting the deliverer to close the door. If the door is still open at the end of this 10 seconds the CENTRAL CONSOLE sends an urgent, failed delivery message to the Application Server, via the LSM, and logs the deliverer out of the system.

At step 326 if the deliverer confirms that the delivery was successful the CENTRAL CONSOLE returns to the delivery main menu. If the deliverer presses the 'no' key the CENTRAL CONSOLE asks if the door was shut by mistake. If it was then the CENTRAL CONSOLE re-opens the door in step 328. If the door was not shut in error the CENTRAL CONSOLE asks if the locker is dirty or damaged in steps 343 and 345. If it is the CENTRAL CONSOLE sends an appropriate message to the LSM which forwards it on to the Application Server. The CENTRAL CONSOLE then looks for another appropriately sized locker in step ~~352~~ 351. If it finds an available locker it opens the door and prompts the deliverer to put the goods inside. If no locker is available the delivery is refused, a message informs the deliverer that there is no space and a message is sent to the Application Server, via the LSM.

If the locker is clean and undamaged the CENTRAL CONSOLE asks the deliverer if the locker is too small for the package. If it is the CENTRAL CONSOLE looks for an available locker of the next size up. If the next size up is available it opens the locker door and asks the deliverer to put the package inside. If the maximum size has been reached and the package has still not been delivered, because it is too big or because there is no availability, the delivery is refused and a message is sent to the Application Server via the LSM. Once a delivery has been successfully made the delivery main menu is displayed by

the CENTRAL CONSOLE and the deliverer is free to continue with any other deliveries for that site or log-out.

To complete the delivery process the CENTRAL CONSOLE must inform the Application Server that a delivery has been made so that the Customer ~~400~~ 1200 can be contacted. If (330) the package was processed with a bar-code the Parcel ID has not been entered and therefore it retrieved from the Application Server in ~~step 332~~ STEPS 331, 332, 335. If an associated Parcel ID is not found the LSM logs the delivery as incomplete (333) and an error message is sent to the Application Server. Once the Parcel ID is present the CENTRAL CONSOLE invokes an asynchronous process, in step 334, to generate a Collection Code and send it to the Customer ~~400~~ 1200.

At steps 336 and 337 the CENTRAL CONSOLE generates the Collection Code and sends it, via the LSM, together with the Delivery Company ID and the Parcel ID to the Application Server, which then uses the Parcel ID to determine which Customer ~~400~~ 1200 this package is for (338). In step 339 the Application Server sends the Collection Code to the Customer ~~400~~ 1200, using their preferred channel as set-up in Register 100, together with a message informing them that their goods have arrived and reminding them where and how to collect them. The delivery company is referenced using the Delivery Company ID and a message is sent (340) informing them that the package has arrived.

At step 341 and 342 the Application Server sends the CENTRAL CONSOLE, via the LSM, the Customer ~~400~~ 1200's PIN together with the Parcel ID. At this point the CENTRAL CONSOLE is ready for the Customer ~~400~~ 1200 to collect their goods.

Collect Goods 400

FIG. 11 describes how the Customer ~~400~~ 1200 retrieves his goods from the locker. Once the Customer ~~400~~ 1200 has received the message with the Collection Code he is free to retrieve

his goods at his own convenience. When he approaches (401) the ACP Site 900, the CENTRAL CONSOLE prompts him for his Collection Code in step 402. Once the Collection Code is entered (403) the CENTRAL CONSOLE validates it against its orders database in step 404. If (405) the code is invalid an error message is displayed and the Customer ~~400~~ 1200 is prompted to re-enter the code (406). If a valid code is entered the CENTRAL CONSOLE then asks the Customer ~~400~~ 1200 to enter their PIN, in step 407, and validates the entry in step 408. If (409) an invalid PIN is entered the CENTRAL CONSOLE displays an error message (410) and asks (411) the Customer ~~400~~ 1200 if they want to re-enter the PIN or if they need the PIN re-issued. If they want to re-enter, the CENTRAL CONSOLE re-displays the PIN entry screen at step 407. If the Customer ~~400~~ 1200 requests a re-issue of the PIN (412, 413) they are informed that they cannot collect their goods at that time and that their PIN will be re-sent immediately. In steps 414 and 415 the CENTRAL CONSOLE sends the Collection Code back to the Application Server, via the LSM, and asks the Application Server to re-issue the Customer ~~400~~ 1200's PIN. Using the Collection Code, the Application Server looks up the Customer ~~400~~ 1200's details (416) and re-issues the PIN using the Customer ~~400~~ 1200's preferred delivery channel in steps 417 and 418.

If a valid PIN is entered in step 409 the CENTRAL CONSOLE checks (419) if the Customer ~~400~~ 1200 owes any money for rental of the locker. Depending on the business model implemented the Customer ~~400~~ 1200 may pay for storage in part or completely. If money is owed the CENTRAL CONSOLE proceeds in step 420 to calculate the amount due based on an algorithm stored locally. In this embodiment payment can only be made using a pre-paid card bought with cash from the retail Host 1100. In future embodiments payment will be possible using credit and debit cards.

Once the CENTRAL CONSOLE has displayed the amount due the Customer ~~400~~ 1200 makes payment, in step 421, by presenting his prepaid card to the bar-code reader. The

CENTRAL CONSOLE reads the bar-code and looks up (422) the amount available for that card on its local database. In ~~step 423~~ STEPS 423, 425, the CENTRAL CONSOLE determines if there is sufficient credit available. If so the CENTRAL CONSOLE asks the LSM to update the new card balance on all other sites (427) and proceeds in steps 428 and 429 to open the door to the locker containing the Customer ~~400~~ 1200's goods. If there is insufficient credit (424, 426) the CENTRAL CONSOLE reduces the balance on the card to zero, communicates this new balance to all other sites via the CENTRAL CONSOLE and informs the Customer ~~400~~ 1200 that they must charge their card with more money before they can retrieve their goods.

At step 429 the appropriate locker door is opened and the Customer ~~400~~ 1200 retrieves their goods in step 430. At step 431 the CENTRAL CONSOLE checks to see if the Customer ~~400~~ 1200 has closed the locker door. If he has the CENTRAL CONSOLE immediately locks it in step 433. The Customer ~~400~~ 1200's Collection Code for that package is kept active on the CENTRAL CONSOLE database for a further 5 minutes in case the Customer ~~400~~ 1200 has shut the door in error (434). This may happen for a variety of reasons: for example the Customer ~~400~~ 1200 may be distracted before collecting their goods and inadvertently close the door. Once 5 minutes has elapsed the Customer ~~400~~ 1200 Code and PIN combination is deleted from the CENTRAL CONSOLE's order database (435) and the CENTRAL CONSOLE marks the locker as available for delivery (436). If the locker door is not shut 30 seconds after it is opened it remains open until the next delivery is made (432).

Collection Expiry 500, 530

The Customer ~~400~~ 1200 is given a fixed period to collect their goods once they have been delivered to an ACP Site 900. This period comprises a free collection time and a chargeable extension. If when this combined period has ended the goods have not been

retrieved they are sent back to the Etailer 700. FIG. 12 describes this collection expiry process.

As part of its daily processing routine, the Application Server identifies all deliveries that are within 24 hours of the end of the free collection time (501) and sends each Customer ~~400~~ 1200 a message (502), via their preferred communication channel, warning them that they will be liable to a charge if their goods are not collected within the next day. At step 503 the Application Server checks to see, for each delivery identified in step 502, if the Customer ~~400~~ 1200 has retrieved the goods. If they haven't (504) the LSM marks the order as overdue and applies a fee every day for the remainder of the chargeable extension period or until the Customer ~~400~~ 1200 collects their goods, whichever is the sooner. If (505) the Customer ~~400~~ 1200 collects their goods before the end of the chargeable extension period they must pay the overdue amount before the appropriate locker door is opened (506), as described in Collect Goods 400.

When the chargeable extension ends the CENTRAL CONSOLE marks the Parcel ID of that package as expired on its orders database (507) and send a message to the Application Server via the LSM (508). In step 509 the Application Server looks up the Customer ~~400~~ 1200's account based on the Parcel ID and sends a message to the Customer ~~400~~ 1200, via their preferred channel, telling them that their order has expired and will be sent back to the Etailer 700. As part of its daily processing routine the Application Server produces a list of all expired Parcel IDs by ACP Site 900 (510) and sends notification to the relevant delivery companies that return collections are required (511).

In step 512 the deliverer approaches the CENTRAL CONSOLE at the ACP Site 900 containing and expired order and logs-on to the CENTRAL CONSOLE in the normal way, as described in Deliver Goods 300. From the delivery main menu, the deliverer selects 'expiry' (513). At step 514 the CENTRAL CONSOLE prompts the deliverer to enter the

Parcel ID of the first expired order to be collected. In steps 515 and 516 this code is entered by the deliverer and validated by the CENTRAL CONSOLE against its order database containing expired orders. (517) If the code is invalid the deliverer is asked to re-enter the code or log-out of the system. (518, 519) If a valid code is entered the CENTRAL CONSOLE opens the appropriate locker door in step 520 and the deliverer retrieves the expired order from the locker in step 521.

At step 522 the CENTRAL CONSOLE checks if the locker door has been closed. If it has the door is immediately locked and a timer set. (524) The Parcel ID for that expired order is kept valid for a further 5 minutes in case the deliverer has made a mistake and has left the goods in the locker. (525) At the end of this period the CENTRAL CONSOLE deletes the Parcel ID from its orders database (526) and marks the locker as available for delivery in step 527. If, at step 522, the deliverer has not shut the door and fails to do so within 30 seconds of the door being opened, the door is left unlocked and available. (523)

Partner Settlement 600

The method and apparatus of the present invention introduces efficiencies into the system for residential deliveries. These efficiencies are made possible through the integration of the present invention with order systems of Etailer 700 s and the use of retail space of ACP Host 1100s. FIG. 13 and FIG.14 describe the process of settlement between these commercial partners. FIG. 13 describes this process for Etailer 700 s; FIG. 14 describes this process for ACP Site 900 Host 1100s.

At the end of every calendar month the Application Server analyses all deliveries made to an ACP Site 900 by Customer ~~400~~ 1200 s of registered Etailer 700 s. A charge is calculated, (601) for each Etailer 700 , based on this analysis and an invoice dispatched, in step

602, payable in 30 days. At step 603 the Application Server checks if the invoice has been paid. If it hasn't the payment is classified as late (604) and in step 605 the Etailer 700 is contacted to chase-up the debt. Depending on the response in step 606, the Etailer 700 is either suspended from the system (607) or further chase-up is requested.

At the end of every calendar month the Application Server analyses all deliveries made to every ACP Site 900 of a Host 1100 partner (651, 652). A charge is calculated, for each ACP Host 1100, based on this analysis (653) and an invoice dispatched, in step 654, payable in 30 days. At step 655 the Application Server checks if the invoice has been paid. If it hasn't the payment is classified as late (656) and in step 657 the ACP Host 1100 is contacted to chase-up the debt. Depending on the response in step 658, the ACP Host 1100 is either suspended from the system (659) or further chase-up is requested.

Close Doors 1300

As part of both the Deliver 300 and Collect Goods 400 processes there are occasions when the locker doors will be left open as part of normal business. This is untidy and leaves the lockers liable to be damaged or dirtied. To mitigate this risk the deliverer will attempt to close any open doors when he visits the site to make a delivery or collection.

In step 1301 the deliverer logs-on to the CENTRAL CONSOLE in the normal way, as described in Deliver Goods 300. From the delivery main menu, the deliverer selects 'close doors' (1302). At step 1303 the CENTRAL CONSOLE asks for the number of the doors which need to be closed and locked. The deliverer enters the door numbers in step 1304 and in step 1305 the CENTRAL CONSOLE sets each door to lockable mode and

prompts the deliverer to close the selected door. As soon as each door is closed the CENTRAL CONSOLE locks it. (1306)

Delivery Company Registration 1400

Validation of delivery men is an essential requirement of both the Deliver Goods 300 and Collection Expiry 500 processes. To enable validation delivery companies must first register with the service. This process is described in FIG. 16.

At step 1401 a new delivery company account is established on the application server and a unique Delivery Company ID is generated. (1405) If the delivery company requires individual accounts to be established for each of their delivery men (1402) this is completed in step 1403. Similarly if delivery companies want to integrate the Delivery Company ID into their systems via bar-code reading (1404) this is done in step 1406.

Once a new delivery company has been added the new Delivery Company IDs it downloaded (1407) to the CENTRAL CONSOLE at each ACP Site 900.

ACP Host Registration 1500

To facilitate Partner Settlement 600 and to uniquely identify each ACP Site 900 it is important to establish an account for each ACP Host 1100. Steps 1501 and 1502 complete this process by establishing a unique account number on the application server for each Host 1100 together with unique IDs for each ACP Site 900. Once these IDs have been generated they are downloaded to the CENTRAL CONSOLE at each ACP Site 900 in 1503.

Etailer 700 Registration 1600

To facilitate Partner Settlement 600 and Collection Expiry 500 the application server it able to identify each separate Etailer 700. At step 1601 an account is established for each new Etailer 700 and a unique ID is generated. (1602) If the Etailer 700 is able to provide bar-coded labels this is recorded in the application server at step 1603.

I. Courier Independent Delivery Model

Figure 19 illustrates a computer network architecture employed in embodiments of the invention which support courier independence. In such embodiments, the user employing a web browser 2010 or alternatively the e-tailer 2008 may select one of many possible couriers 2002 2004 2006 to deliver an item ordered from an e tailer to a desired collection point. Processes employed to support such embodiments are illustrated in Figures 20-29.

Figure 20 illustrates a process for determining an address for delivery of the ordered item. The customer interfacing with the e-tailer 2008 via the browser 2010 may provide a delivery address 2102, which is then checked for validity 2103. In embodiments, cookies located on the web browser 2010 may be searched for a collection point 2110. Alternatively, a central database may be queried to determine a collection point which can accommodate the item, or package 2111.

A process for calculating delivery fees is illustrated in Figure 21. The package weight, size, and ship-from-address are determined from the e tailer 2008 server 2201. In embodiments of the invention, for each courier and each level of service available from that courier, a fee is determined 2205-2210. In some embodiments, all of this information is presented to the customer on the web browser 2010, so that the customer may select shipping options via a form on the browser 2010. In alternative embodiments, the

cheapest rate for a desired service/address combination is selected 2212. Other alternative rate selection schemes facilitated by such embodiments will be apparent to those skilled in the art.

In embodiments of the invention illustrated in Figure 22, a shipping page is generated 2213 for posting on the web browser 2010. In some such options, the customer is presented with a rate grid with a price and courier for each service/address combination 2301. Upon completion on all purchases from the etailer 2008, the process of shipping the order commences 2310.

Figure 23 illustrates a process for registering a customer's collection point preferences and personal contact information. The customer is asked for contact information, including e-mail address 2401. The e-mail message may be checked for validity 2402. The customer may be asked to create a password for accessing lockers in the collection point 2404. This password may also be checked for validity 2405, and the procedure may be repeated 2406 until a valid password is set and confirmed 2407. Collection points available to the customer may be calculated 2412, and upon the customer's selection, one such collection point may be chosen as a default 2413. Cookies containing the customer's preferences may be written 2409 2415 to the customer's browser 2010.

The invention includes techniques for applying discounts for the delivery of multiple items. Embodiments for calculating such fees dynamically 2207 are illustrated in Figure 24. In one such embodiment, a grid of possible delivery dates for the item may be presented to the customer/user 2501. In some such embodiments, a discount may be offered to the user for consolidating multiple pre-scheduled deliveries 2503 2505 2506 2507. In some embodiments, a pro-rata discount may be available to the user 2510. A delivery fee is ultimately tabulated 2513.

In embodiments of the invention, the etailer 2008 does not carry stock. This situation is typical of many if not most e tailers in operation as of the time of this writing. Such a situation is illustrated in Figure 25. In such circumstances, the e tailer 2008 locates, receives, and packages the goods to be distributed 2601. The order for the goods is received and a courier is identified 2603. A tracking number is generated according to rules specific to the courier and a label may be printed with an address for the collection point and/or a bar-code tracking number 2604. A locker at the collection point is reserved 2611 for delivery of the goods. Figure 26 illustrates a settlement procedure employed for settling the transactions conducted with the e tailier. The procedure loops through multiple transactions 2702 2703, and sets the prices for each according to whether the scheduled shipping date agrees with the actual shipping date (2705, 2706) this determines whether the consolidated shipping fee or the full price for the appropriate collection point is assessed 2707. Figure 27 illustrates a process for setting the initial parameters for tabulating discounts. If dynamic fee calculation is available 2801, the appropriate binary parameter is set 2803, and the parameter initialization proceeds to determine if the consolidation discount is available 2804. If so, the appropriate binary parameter is set 2806, and the procedure determines whether pro-rata consolidation 2807 is available, and sets the appropriate binary parameter accordingly 2809.

A process for scheduling delivery of the goods to the collection point is illustrated in Figure 28. The procedure determines that the collection point is automated 2902 and checks for availability of the collection point 2904, 2905. If space is unavailable at the collection point , alternative collection points may be sought 2911 2912, and home delivery options 2913 may be pursued. Figure 29 illustrates a process for delivering an item from a customer residence to an automated collection point; such procedures may be

utilized in case a customer requests home delivery from an e tailer, but is unavailable for the actual delivery.

J. Single Courier Model

Embodiments of the invention presume a single courier will be used to deliver goods ordered from the e tailer to a collection point. Figure 30 illustrates a block diagram used in such embodiments. A customer is connected to the Internet via a web browser 3000 looking at an e-tailer web site. The e-tailer web server 3002 is connected to the courier's host server 3004, referred to in the Figure 30 as the central server. A key part of this architecture is the seamless nature of this connection – the customer is unaware that processing is taking place outside the etailer web-site.

The e-tailer keeps accounts of its own customer records, orders and inventory. The courier's central server interfaces to the e-tailer web server and may keep account of its own customer records; list all the collection points; list pending deliveries to those collection points; contain shipping rates for deliveries to those collection points; and hold system parameters which are used in the delivery fee calculation.

Figure 31, labeled Address Determination, is a process flow diagram for determining the delivery address. The customer selects goods on an etailer site and proceeds to the checkout in the customary way 3101. The e tailer then asks the customer to provide a delivery address for that particular order (3102). Once a valid address is established 3103, the first interaction between the e-tailer server and the courier's central servers occurs. The procedure verifies whether the customer has already given a collection point address 3104. If they have then 3105 the procedure checks that the collection point can handle the package size. This involves an interaction between the e-tailer server, which contains detailed inventory information, and the courier's central server which contains

size restrictions for all collection point (this is particularly important for automated collection points where enclosures will have specific size limitations). If the goods fit then a fee for that delivery can be calculated 3108.

If a collection point address isn't entered 3104, which will be the normal situation for the majority of new customers who will simply put their own home address, then 3107 the courier's central server searches for a cookie on the customer's device which may contain collection point preferences. To use a collection point, customers are first registered and as part of the registration process any preferences they specify will be written to a cookie stored on their device. If default collection points are found within that (3109) cookie then the procedure 3110 determines if any of the collection points chosen can handle the package size.

If a customer isn't registered or hasn't specified defaults then the central servers are asked to calculate the nearest collection points to the delivery address specified by the customer. Furthermore, only collection points that can accommodate the given package (3111.) are selected. The system 3112 3113 establishes the criteria for this search: system defaults specified by the courier are read 3112; defaults specified by the customer are also read 3113. System defaults could include one or more of the following: a default search radius, a maximum number of collection points to return and a preference for automated over manned collection points. Customer defaults may include search radius and feature of the collection point such as: 24 hour accessibility, high security, indoors. Once these criteria are combined the database of collection points is queried 3114. If the search is successful and a collection point(s) is found (3116) then processing moves to Delivery Fee Calculation 3115. If the search is unsuccessful, then collection point processing ends 3117. Thus, the purpose of Address Determination ~~3100~~ is to establish if there is a

collection point of suitable size, near the customer's specified delivery address. And the next step is to calculate the fee associated with each of the collection points available.

Method of fee determination employed by embodiments of the invention differ substantially from fee calculations for residential deliveries. The sharing of a single delivery address across many customers introduces cost savings which can be passed onto customers through delivery fee discounts. Such discounts may arise, for instance, when two separate customers schedule deliveries to the same collection point on the same day.

Referring to Figure 32, the package weight, size and the ship from address (i.e., the e-tailer's storage address) may be read 3201 from the e-tailer server. Then the first collection point address is read in 3202 – there may be several addresses that need to be priced. The various services available for the first address are read in 3203. Services relate to the time dimension of delivery: typically couriers offer a variety of services from next day through to one week. now such as 1 day, 2 day, or 3/7 days services.

The delivery fee calculation procedure 3204 checks whether dynamic fee calculations are allowed by the courier. Such a parameter gives couriers the opportunity to pass back cost savings to customers on a case-by-case basis. If the dynamic fee flag is set 3204, then 3206 a shipping date is confirmed. A confirmed shipping date is a pre-requisite to any meaningful dynamic fee calculation – without such a date there is no way to determine when the goods will be delivered and therefore little point in trying to determine if there will be any savings that can be passed back to the customer. If a shipping date hasn't been confirmed by the e-tailer, then step 3208 calculates and stores the delivery fee for each level of service based on a static fee table (i.e., a table that doesn't change based on the specifics of that delivery). If however, if a shipping date is confirmed, then the processing moves on to Dynamic Fee Calculation 3205. If this is the last collection point address 3209, then processing moves on to Format Shipping Page 3210; if not the next address

is read and the above steps are repeated. In summary, Delivery Fee Calculation determines the appropriate delivery fee for every possible collection point address and delivery service combination. In embodiments of the invention the output is a grid of charges plotted against two axes: timescale of delivery and delivery address.

Format Shipping Page, illustrated in Figure 33, is responsible for presenting this grid of charges to the customer. The processing 3301 generates the grid described above. If the customer then selects a collection point for delivery 3303, the system 3305 checks whether the customer is registered. By definition, packages delivered to a collection point will not be delivered to a customer's home address. Such a system introduces two new requirements to the delivery process: 1) the need to identify the customer – this can no longer be done using their home address; 2) the need to contact the customer to tell them that their goods have arrived at the collection point and are ready to collect. Both pieces of information are required before a delivery to a collection point can be sanctioned. Once the customer is registered, and they have completed the purchase, the order can be shipped.

Figure 34 describes the Customer Registration process in more detail. E-mail address and password are collected from the customer in steps 3401 through 3405. The customer is given the opportunity to specify personal preferences 3407 which are written in a cookie to the customer's device. Options available, as mentioned above, may include preferred features of the collection point chosen such as: proximity to a car park, 24 hour accessibility, level of security, manned of automated. Other options will be apparent to those skilled in the art. As part of registration the customer is also asked to specify default collection point addresses. These might be near a customer's home, near their place of work or en route between the two. The system 3411 prompts the customer to enter their delivery address and proceeds 3412 to calculate the collection points in that area. The

system 3413 then prompts the customer to select one or more as a default – to be used when calculating delivery fees. A customer may want to specify a number of defaults knowing that certain carriers offer dynamic fee calculation which may result in a price differential between sites for a given delivery. Once all preferences are recorded on the customer's cookie processing moves to Format Shipping Page 3414, 3409, 3415, 3410.

Figure 25 35 describes the Dynamic Fee Calculation process 3207. It allows calculation 3513 of individual fees based on the particulars of a customer's order. More precisely it allows the cost savings, associated with multiple customer sharing one address, to be passed on to those customers if a courier so wishes. The process 3501 builds a grid of possible delivery dates that are available, and then 3502 reads in the delivery dates for the first service provided by the courier. In the first key step, it checks whether the courier will allow discounts to be offered to the customer in the event that another delivery is already scheduled for that collection point on that day 3503. Clearly, as many customers share one address it's highly possible that several deliveries may arrive at that address on a given day – hence the possibility of consolidation discounts. The number of existing deliveries scheduled for each date given is calculated 3505 and stored against that service in a temporary grid in memory.

If there are other deliveries scheduled on that day, then a further key check is made 3508 as to whether the courier will provide a pro rata consolidation discount. Once consolidation has been established the courier has two choices: 1) offer a fixed discount; 2) pro rata the discount based on the number of items delivered to that site on that day. In the current delivery system, where all items are sent to individual addresses (corporate or residential), if there were deliveries to five separate addresses then the courier would have a minimum of five trips – assuming all customers were in to accept delivery. Using this new model couriers are guaranteed to make one trip (collection points are always open to

accept deliveries). So there is at least a five fold saving in such a scenario and its whether the courier decides to pass on additional discount based on that level of consolidation that it's checked for in 3508. If they do, then in 3510 the day with the highest number of scheduled deliveries is calculated to allow the customer a maximum discount and 3511 a pro rate consolidation discount is calculated. If 3508 the pro rata is not allowed, then 3509 the consolidated discount is calculated based on a flat amount.

If the results of the query to the pending deliveries table reveals no scheduled deliveries to that collection point on any of the days available, then step 3507 looks up the standard fee to that site from the courier's rate database. This is different from the static database kept on the e-tailer server, simply because this allows the courier to update their rates for a particular collection point at their convenience. Then this loop is iterated again 3512, 3504 for the next service available until all service options have been exhausted.

Figure 36 describes the Ship Order process. Once a purchase order is placed by the customer the etailer must locate the goods ready to be shipped. Often etailer do not have the goods in stock and they must be ordered from a supplier or another distribution center. Once the goods are received at the distribution warehouse they are packaged 3601. Next a label is printed that includes the collection point address and a tracking number generated that can uniquely identify the package. The system 3602 looks up the customer order and determines the appropriate collection point address. The system 3603 then generates the tracking number by linking to the courier's central server. It then proceeds to the print the package label using the address and the bar-coded tracking number 3604.

The system dispatches 3605 the goods and writes a transaction record to the settlement log 3606. Simultaneously 3608 it checks to see if the destination collection point is automated. If so the tracking number is sent to the collection point memory 3610, in preparation for delivery. Automated collection points only allow delivery of goods that

are scheduled for that site. To perform the necessary validation the tracking numbers of all pending deliveries must be downloaded as soon as the goods are dispatched. Automated collection points allow the reservation of a particular enclosure 3611 for a specific delivery. If such a reservation is required then confirmation is sent to the collection point regarding when the package is dispatched.

Figure 37 describes a standard settlement process, with one caveat. As was mentioned in Dynamic Fee Calculation, consolidation discounts can only be offered to the customer if a guaranteed shipping date is known. If this shipping date was confirmed by the e-tailer but then subsequently not met, the system 3707 prevents the courier from loss of revenue by applying the full non-consolidated shipping fee to the etailer's account. Clearly, the customer still benefits from a consolidation discount, but the e-tailer is effectively punished for a delay in shipping the goods by being charged the difference between this figure and the full amount. The remainder of the steps in this process describe a standard loop for reading in transactions, summarizing them for each e-tailer and submitting an invoice.

There are a number of options available to the courier when calculating delivery fees. Figure 38 describes the setting of these flags. First 3801 the courier chooses whether to allow any dynamic calculation of fees. If they do then 3803 the dynamic fee flag is set to on. The courier is then given the option 3804 of going further and allowing discounts based on any consolidation. If they do then the consolidation flag is turned on in 3806. Finally 3807 the courier is asked whether they would like to pro rata any consolidation discount awarded to the customer. If they do then the pro rata consolidation discount flag is turned on 3809.

Figure 39 describes processing that is another unique attribute of an automated collection point network: the ability to guarantee that a delivery person will never arrive at

a full automated collection point. In step 3901 all deliveries scheduled for collection points for that day are read from the courier's central server and the first of these is read into memory 3902. The system 3903 checks that the delivery is for an automated collection point – if it is not then no advanced availability checking is possible and the next delivery is read 3904.

If the delivery is for an automated collection point then the system 3905 checks the availability of this site from the collection point table stored in the central server. If space is available in a suitably sized enclosure, the delivery is confirmed 3906 and the delivery window is passed to the logistics system of the central server. This step highlights a major benefit of automated collection points: the capacity to receive deliveries 24 hours a day and particularly at night.

If space is unavailable 3907, the processing checks if this is the last available delivery date within the service commitment. If there are days remaining (e.g. the delivery was promised within 3 to 7 business days and it is only day 5) then the delivery is postponed 3908 and marked for review on the next available delivery day. If, however, it is the last permissible delivery date, then the customer's collection point preferences are read 3909 from the central server. Customers may elect to have goods delivered to an alternative collection point should their preferred site be full. Such instructions are established by the customer as part of registration. If 3910 the customer has given permission for an alternative site to be used then 3911 the availability of all collection points is checked within a five mile radius of the original collection point address.

If 3913 there is availability at a suitable alternative site then delivery is confirmed to this address and 3916 ~~3906~~, the scheduling flexibility of this new site is confirmed to the carrier's routing and logistics system. If there isn't any availability at any collection point near the customer's home or if there are no alternative collection points, then the customer's

account is read again 3912 to determine if they will allow home delivery. Clearly if a customer has arranged for goods to be delivered to a particular collection point and it's busy, it may be more convenient for the customer to receive the goods at home rather than experiencing a delay. If the customer has given permission for home delivery, then confirmation is sent 3914 to the courier's routing system that delivery should be made to the customer's home address. If customers have not specified home delivery as an alternative option, then a customer contact is scheduled arranged 3915 and the delivery is postponed until the next delivery day. This process is repeated 3917 until all collection point transactions for that day have been processed 3918.

Figure 40 describes another unique facet of a collection point network – the ability to redirect a residential delivery to a collection point in the event that the customer is not in to sign for the goods. More specifically this process allows the delivery man to determine immediately if there is availability at a nearby collection point and facilitates the automatic recalculation of the most economic route that includes this new address.

Once the delivery man has determined 31001 that the customer is not in to receive the goods, he asks his PDA to connect 31002 to the courier's central server and read in the customer's details. 31003 If the customer is a registered collection point user, then their account is accessed to determine 31006 if they have given permission for delivery to a collection point if they are not in to receive goods. If they have given permission, then in 31007, their preferred collection points are read. If they haven't specified preferences, then the central server searches 31008 for collection points within five miles of their home address. 31009 If collection points are found, or if preferences are given as part of their account details, then 31010 the availability of these collection points is determined starting with the closest. If in 31011 a collection point is available then the courier's logistics system is asked if to determine 31013 if an economic route exists which incorporates this new address in the remainder of the

delivery man's route. If it is economic to deliver to that collection point then the driver's route is updated and the tracking number of the package is downloaded to the collection point in preparation for delivery. If in 31009 no collection points are found with availability, then the package can't be delivered and is returned to the depot. Similarly if none of the collection points has availability or if the alternative route including that collection point in uneconomic, then the package will be returned to the courier's depot.

K. Alternative Embodiments

In an alternative embodiments of the invention, a centralized, synchronous system is used to validate delivery codes for packages delivered to an ACP. In one such embodiment, a package delivered to the ACP is validated by its packet ID, such that the packet ID is sent to the central server for validation. Once the packet ID is validated at the central server, a command to open an appropriate door on the ACP may be sent from the central server to the central console on the ACP.

In embodiments of the invention, a package may be validated by insertion of a delivery company ID to the console. In particular, an ID for the delivery agent which brings the package to the ACP may be used to validate delivery of the package. In some such embodiments, the delivery ID may be sent to the central server for validation. In other embodiments, the delivery ID may be validated asynchronously. In some such embodiments, delivery ID s for each of a plurality of delivery companies may be downloaded to local memory on the ACP console at periodic intervals. In some embodiments, the delivery ID s may be downloaded en masse after a triggering event, such as an opening or closing of a locker door.

In some embodiments, the console does not include a keyboard. In some such embodiments, validation of the package ID may be conducted through wireless interfaces such as a bar code scanner or a wireless transmitter/receiver.

In embodiments of the invention, after delivery of a package to an ACP, a confirmation of delivery may be sent from the ACP to an interface device. In some embodiments, this confirmation may take the form of a digital signature. The digital signature may identify one or more of the following: location of the ACP, time of delivery, package ID, user ID, deliver y company ID.

L. Conclusion

The foregoing description of various embodiments of the invention has been presented for purposes of illustration and description. It is not intended to limit the invention to the precise forms disclosed. Many modifications and equivalent arrangements will be apparent.

CLAIMS

What is claimed is:

1. In an e-commerce computer network system accessible via the Internet, a method of arranging delivery of an item ordered by a customer from a web browser linked to the Internet, the method comprising:

receiving a first address from the customer via the web browser, wherein the address is received by the e-commerce computer network from the customer;

locating a collection point for the delivery of the item, the collection point including a plurality of lockers, the plurality of lockers having a plurality of physical configurations, locating the collection point further including

searching a collection point database, wherein the collection point database is remote from the e-commerce network and is coupled to the e-commerce network via the Internet;

identifying the collection point in the collection point database;

selecting a courier from a plurality of couriers listed in a courier database to deliver the item from a warehouse to the collection point.

2. The method of claim 1, wherein the collection point has a second address, the second address being distinct from the first address.

3. The method of claim 2, wherein the second address is within a pre-determined proximity of the first address.

4. The method of claim 1, wherein selecting the courier further includes dynamically generating a plurality of prices for delivering the item to the collection point by the plurality of couriers.

5. The method of claim 4, wherein the courier corresponds to a lowest price in the plurality of prices.

6. The method of claim 1, wherein identifying the collection point further includes

determining if the collection point includes a locker.

7. The method of claim 1, wherein identifying the collection point further includes determining if a locker from the plurality of lockers in the collection point has a physical configuration capable of accommodating the item.

8. The method of claim 1, wherein the collection point database includes a plurality of collection points, and the collection point is the most proximate of the plurality of collection points to the first address.

9. The method of claim 1, wherein selecting the courier from the plurality of couriers further includes determining if the courier delivers to a second address, the second address corresponding to the collection point.

10. The method of claim 1, further comprising

prior to locating the collection point, selecting a range of delivery times for the item.

11. The method of claim 10, wherein the range of delivery times are within a single day.

12. The method of claim 11, wherein the range of delivery times comprises three or fewer consecutive hours.

13. The method of claim 12, wherein the single day is identical to a day when the item is ordered.

14. The method of claim 12, wherein identifying the collection point further includes determining if the collection point is available for delivery during the range of delivery times.

15. A product delivery system comprising:

an e commerce portal, the e commerce comprising a first computer network coupled to the Internet which allows goods to be ordered via the Internet;

a courier database listing a plurality of couriers, the courier database in communication with the e commerce network via a data link;

a plurality of collection points, each of the plurality of collection points including a plurality of automated lockers, wherein the plurality of collection points have distinct geographical locations and each of the plurality of collection points includes a central server in communication with the e commerce portal via the Internet;

a collection point database, the collection point database in communication with the e commerce network via the Internet, the collection point database containing a plurality of collection point records, each of the plurality of collection point records including

a first collection point field indicating a collection point from the plurality of collection points,

a second collection point field indicating a location for the collection point.

16. The product delivery system of claim 15, wherein the courier database further includes a plurality of courier records, each of the plurality of courier records further including

a first courier field indicating a courier from the plurality of couriers,

a second courier field including a unique identifier for the courier.

17. The product delivery system of claim 16, wherein each locker in the plurality of lockers includes a keypad in communication with the central server.

18. The product delivery system of claim 17, wherein the data link comprises a local area network medium.

19. The product delivery system of claim 17, wherein the data link comprises the Internet.

20. The product delivery system of claim 17, wherein each locker includes a local memory, the local memory in communication with the keypad and the central server.

21. The product delivery system of claim 20, wherein the courier database is replicated on the local memory.

22. The product delivery system of claim 20, wherein each locker includes an automated lock, such that access to the locker is restricted by the automated lock.

23. The product delivery system of claim 20, wherein each locker includes a microcontroller affixed to the locker, such that the local memory is resident on the microcontroller, and the microcontroller is in communication with the central server, such that the microcontroller is operably coupled to the automated lock.

24. The product delivery system of claim 22, wherein each locker includes a transponder affixed to the locker, the transponder in communication with the microcontroller.

25. The product delivery system of claim 22, wherein each locker is coupled to a bar code scanner, the bar code scanner in communication with the microcontroller.

26. The product delivery system of claim 25, wherein the plurality of lockers has a plurality of physical configurations.

27. A method of processing a web-based order for a consumer product, wherein the consumer product is ordered by a user via a web client from an e commerce web portal, and the consumer product is to be delivered to a collection point from a plurality of collection points, the collection points having geographically diverse locations, the method comprising:

receiving the order from the client for the item, wherein the order is received from the web client by a first server at the web portal;

identifying an first geographic address, the first geographic address corresponding to a residence of the user;

identifying a collection point for the delivery of the consumer product, wherein the collection point is selected from a collection point database, such that the collection point has a second geographical address, the second geographical address being within a pre-determined proximity of the first geographical address;

searching a courier database for a plurality of couriers which deliver to the second geographical address;

for each courier of the plurality of couriers, determining a price for delivery of the item to the second geographical address by the courier;

displaying a shipping options web page at the web client, the shipping options web pages listing the price for delivery of the item for each courier of the plurality of couriers.

28. The method of claim 27, wherein identifying the first geographical address includes searching a cookie on the web client, wherein the first geographical address is encoded in the cookie.

29. The method of claim 27, wherein identifying the first geographical address includes receiving the first geographical address by the first server at the web portal from a form on the web client.

30. The method of claim 27, wherein identifying the collection point further includes searching a collection point database for the collection point.

31. The method of claim 30, wherein the collection point database is in communication with the web portal via the Internet.

32. The method of claim 30, wherein the collection point database is located on a second server at the web portal.

33. The method of claim 30, wherein the courier database is located remotely from the web portal and the collection point database, such that the web portal and the collection point database are in communication with the courier database via the Internet.

34. The method of claim 27, further comprising:

after displaying the shipping options web page, receiving an identifier for a courier from the plurality of couriers at the web portal from the web client.

35. The method of claim 34, further comprising:

after receiving the identifier, scheduling a delivery for the item to the second geographical address by the identified courier.

36. The method of claim 35, wherein the collection point includes a plurality of lockers, such that at least one locker in the plurality of lockers has dimensions sufficient to accommodate the item.

37. In an e-commerce computer network system accessible via the Internet, a method of arranging delivery of an item ordered by a customer from a web browser linked to the Internet, the method comprising:

receiving a first address from the customer via the web browser, wherein the address is received by the e commerce computer network from the customer;

locating a collection point for the delivery of the item, the collection point including a plurality of lockers, the plurality of lockers having a plurality of physical configurations, locating the collection point further including retrieving a cookie, the cookie stored locally at the web browser, the cookie identifying the collection point preferred by the customer;

determining if a locker from the plurality of lockers is physically dimensioned to accommodate the item;

determining if the locker is available for delivery of the item at a customer selected time;

selecting a courier from a plurality of couriers listed in a courier database to deliver the item from a warehouse to the locker at the collection point.

sending a string identifier from the e-commerce network system to the customer via the web client, the string identifier indicating a password for entry to the locker.

38. The method of claim 37, wherein the collection point has a second address, the second address being distinct from the first address.

39. The method of claim 37, wherein selecting the courier further includes

dynamically generating a plurality of prices for delivering the item to the collection point by the plurality of couriers.

40. The method of claim 39, wherein the courier has a lowest price from the plurality of prices.

41. The method of claim 37, wherein the courier database includes a record for each courier in the plurality of couriers.

42. The method of claim 41, wherein for each courier, the record indicates whether the courier delivers to the collection point.

43. The method of claim 42, wherein selecting the courier further includes determining that the courier delivers to the collection point.

44. The method of claim 37, wherein the string identifier identifies the courier.

45. The method of claim 37, wherein the string identifier is a dynamically generated password.

46. The method of claim 37, wherein each of the plurality of lockers is operated by a microcontroller, and each of the plurality of lockers has an automated lock coupled to the microcontroller.

47. The method of claim 46, wherein each of the plurality of plurality of lockers is coupled to a keypad, such that the keypad is in communication with the microcontroller.

48. The method of claim 47, further comprising:

receiving the item at the locker from the delivery company;

after receiving the item at the locker, locking the locker.

49. The method of claim 48, further comprising:

after locking the locker, receiving a key sequence from the keypad;

sending the key sequence from the keypad to the microcontroller.

50. The method of claim 49, further comprising:

after sending the key sequence, comparing the key sequence to the string identifier in the microcontroller.

51. The methd of claim 50 further comprising:

if the key sequence matches the string identifier, sending a message from the microcontroller to the automated lock to release the automated lock;

receiving the unlocking message at the automated lock;

in response to receiving the automated message, releasing the automated lock.

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TO SHOW CHANGES MADE

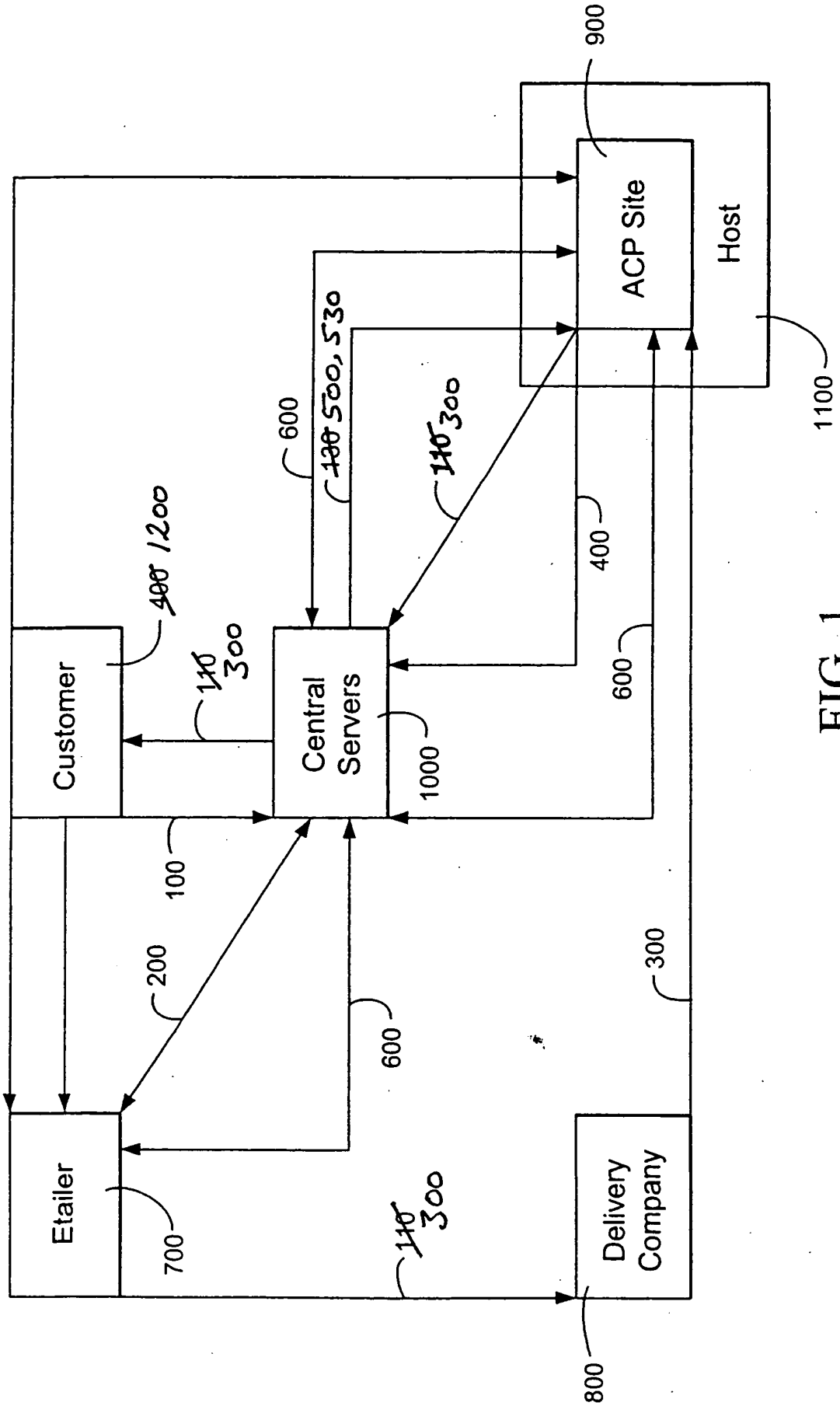

FIG. 1

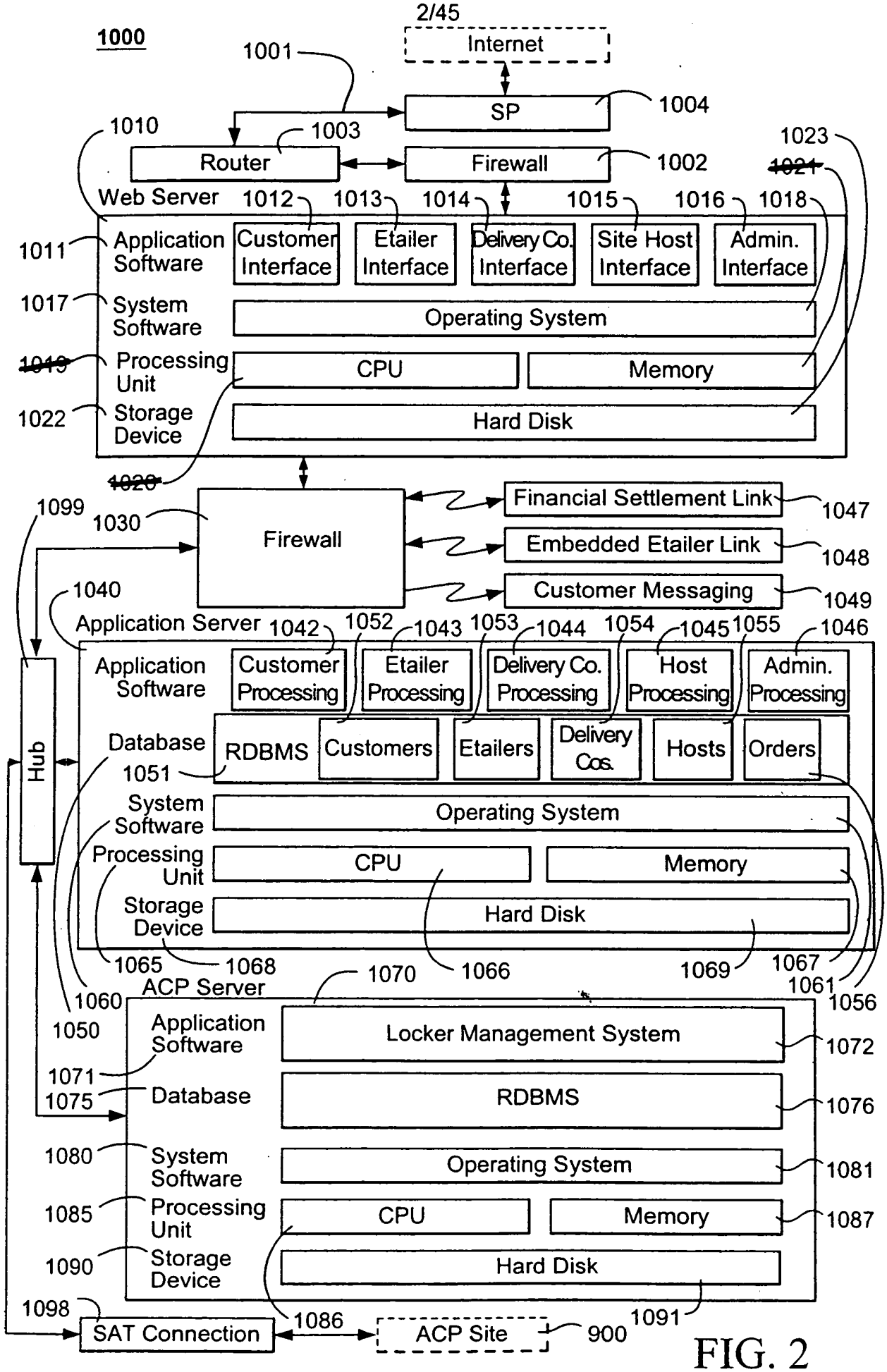
1000
Internet
1001
SP
1004
1010
1003
Router
Firewall
1002
1023
1021
Web Server
1012
1013
1014
1015
1016
1018
1011
Application Software
Customer Interface
Etailer Interface
Delivery Co. Interface
Site Host Interface
Admin. Interface
1017
System Software
Operating System
1019
Processing Unit
CPU
Memory
1022
Storage Device
Hard Disk
1020
1099
1030
Firewall
Financial Settlement Link
1047
Embedded Etailer Link
1048
Customer Messaging
1049
1040
Application Server
1042
1052
1043
1053
1044
1054
1045
1055
1046
Application Software
Customer Processing
Etailer Processing
Delivery Co. Processing
Host Processing
Admin. Processing
Hub
Database
RDBMS
Customers
Etailers
Delivery Cos.
Hosts
Orders
1051
System Software
Operating System
Processing Unit
CPU
Memory
Storage Device
Hard Disk
1065
1068
1070
1066
1069
1067
1061
1056
1060
ACP Server
1050
Application Software
Locker Management System
1072
1071
1075
Database
RDBMS
1076
1080
System Software
Operating System
1081
1085
Processing Unit
CPU
Memory
1087
1090
Storage Device
Hard Disk
1098
SAT Connection
1086
ACP Site
900
1091

FIG. 2

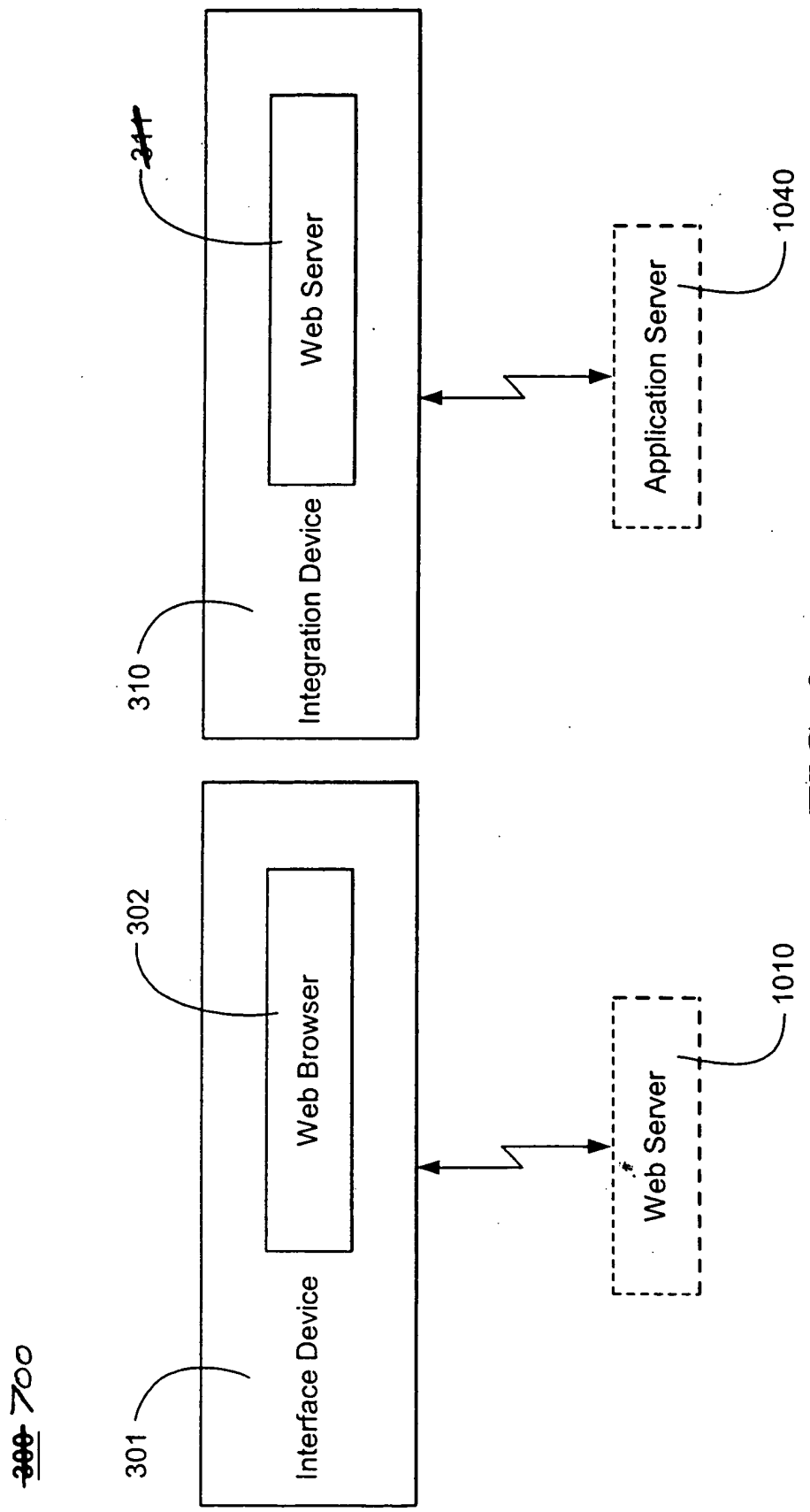
~~300~~ 700
301
Interface Device
302
Web Browser
310
Integration Device
~~311~~
Web Server
1010
Web Server
1040
Application Server

FIG. 3

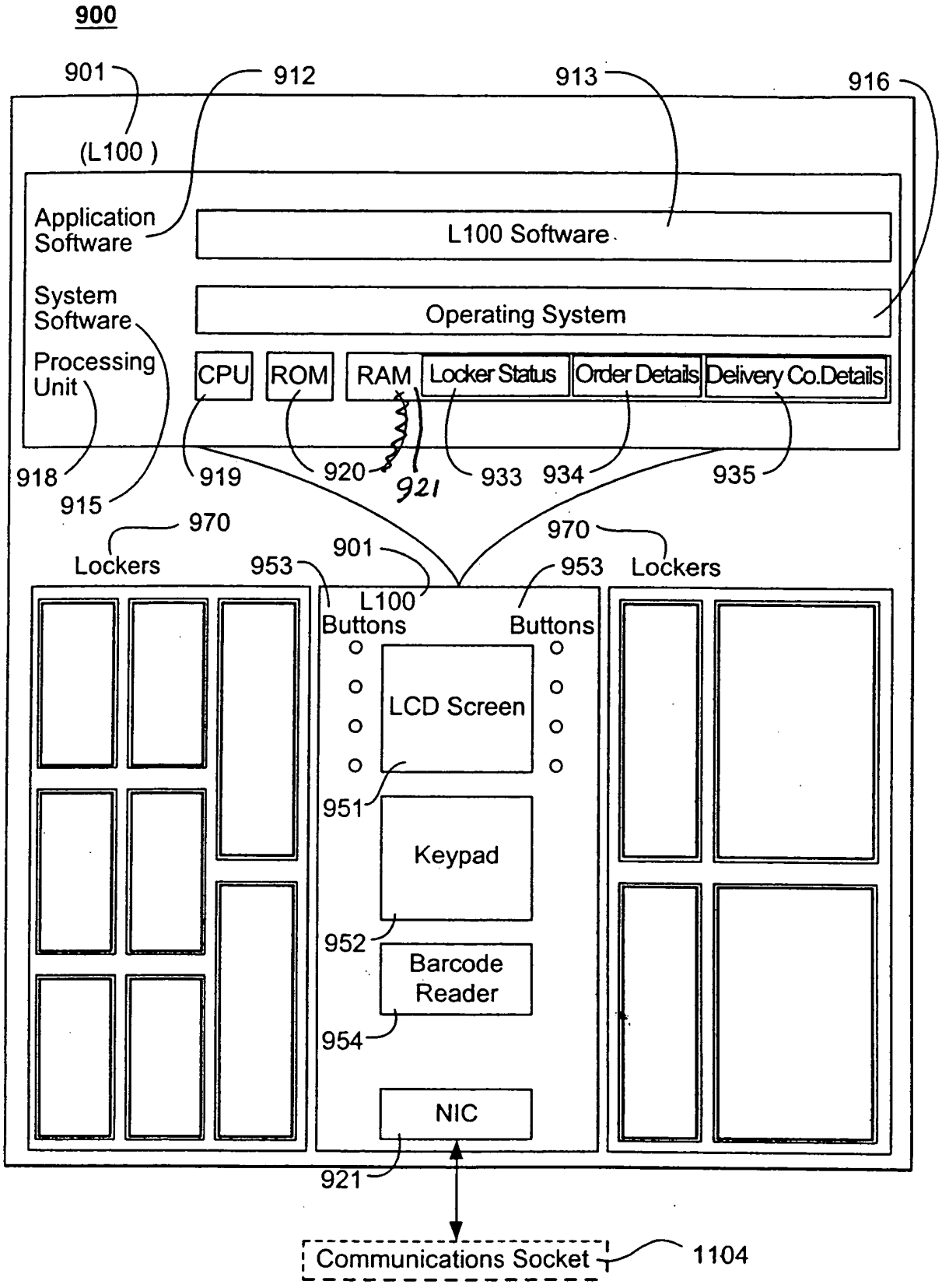
900
901
912
913
916
(L100)
Application Software
L100 Software
System Software
Operating System
Processing Unit
CPU
ROM
RAM
Locker Status
Order Details
Delivery Co.Details
918
919
920
921
933
934
935
915
970
Lockers
953
901
L100
Buttons
953
Buttons
970
Lockers
LCD Screen
951
Keypad
952
Barcode Reader
954
NIC
921
Communications Socket
1104

FIG. 5

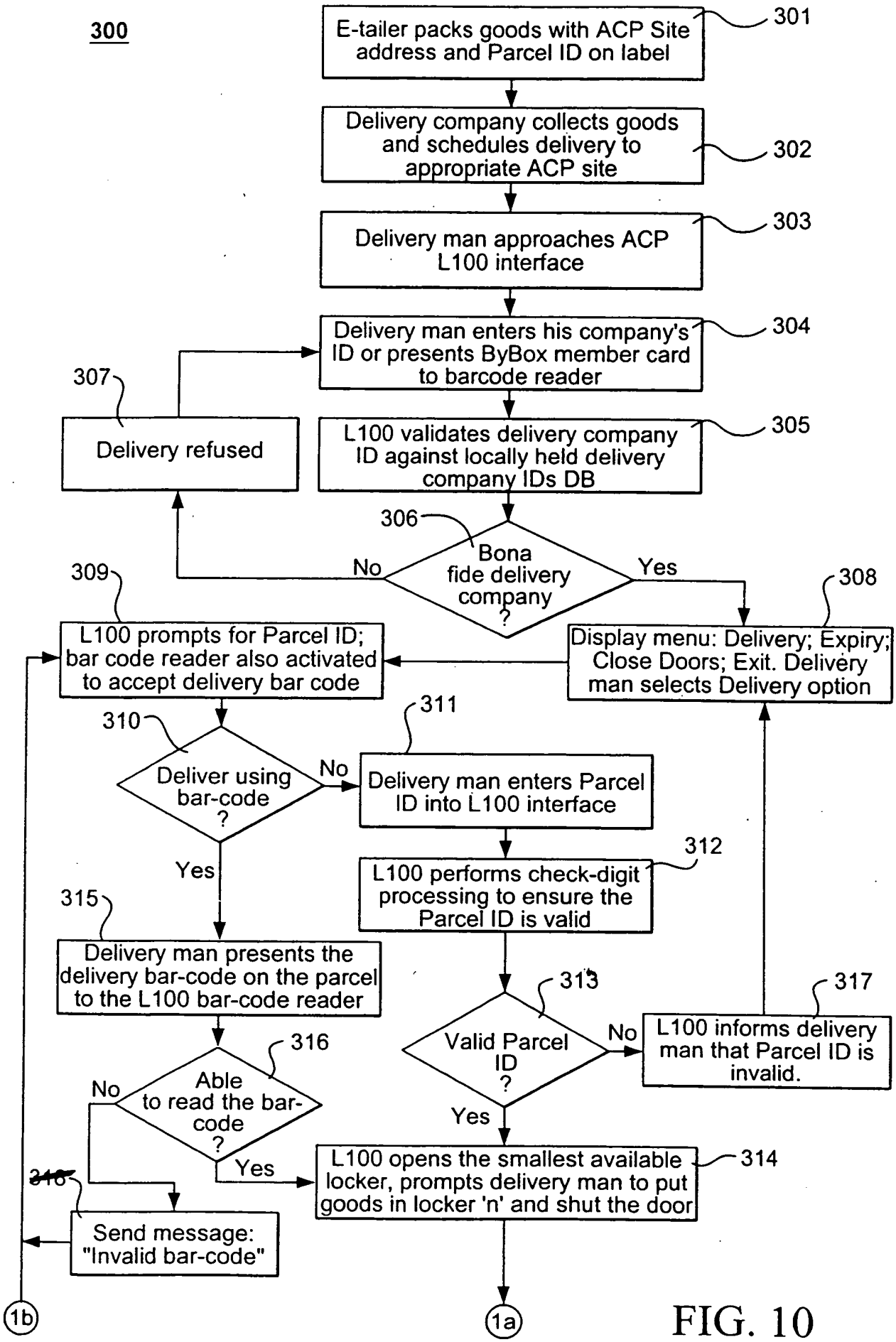
300
E-tailer packs goods with ACP Site address and Parcel ID on label
301
Delivery company collects goods and schedules delivery to appropriate ACP site
302
Delivery man approaches ACP L100 interface
303
Delivery man enters his company's ID or presents ByBox member card to barcode reader
304
L100 validates delivery company ID against locally held delivery company IDs DB
305
306
Bona fide delivery company ?
No
Yes
307
Delivery refused
308
Display menu: Delivery; Expiry; Close Doors; Exit. Delivery man selects Delivery option
309
L100 prompts for Parcel ID; bar code reader also activated to accept delivery bar code
310
Deliver using bar-code ?
No
311
Delivery man enters Parcel ID into L100 interface
312
L100 performs check-digit processing to ensure the Parcel ID is valid
313
Valid Parcel ID ?
No
317
L100 informs delivery man that Parcel ID is invalid.
Yes
314
L100 opens the smallest available locker, prompts delivery man to put goods in locker 'n' and shut the door
315
Delivery man presents the delivery bar-code on the parcel to the L100 bar-code reader
316
Able to read the bar-code ?
No
Yes
316
Send message: "Invalid bar-code"
1b
1a

FIG. 10

300 cont.

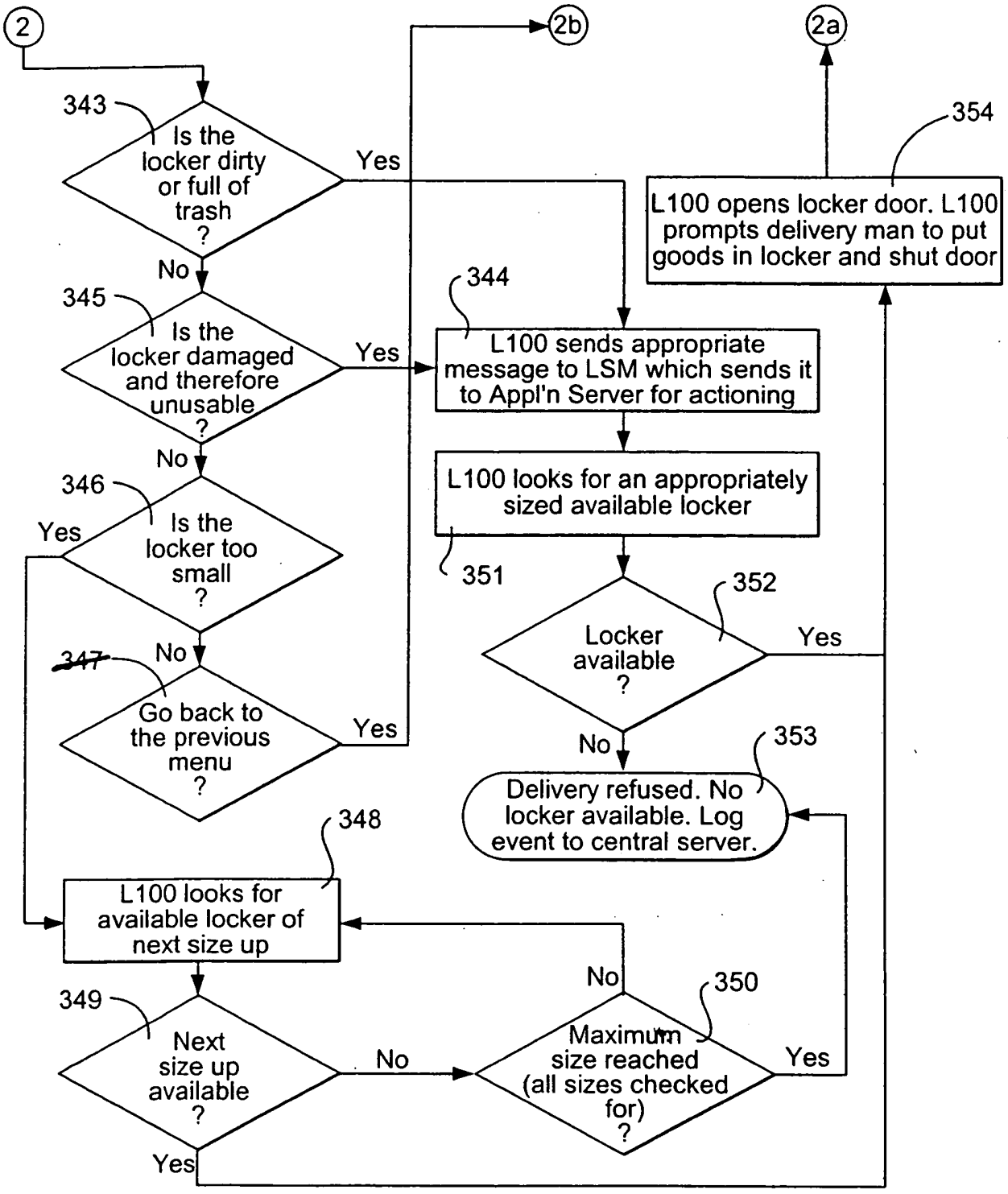

FIG. 10B

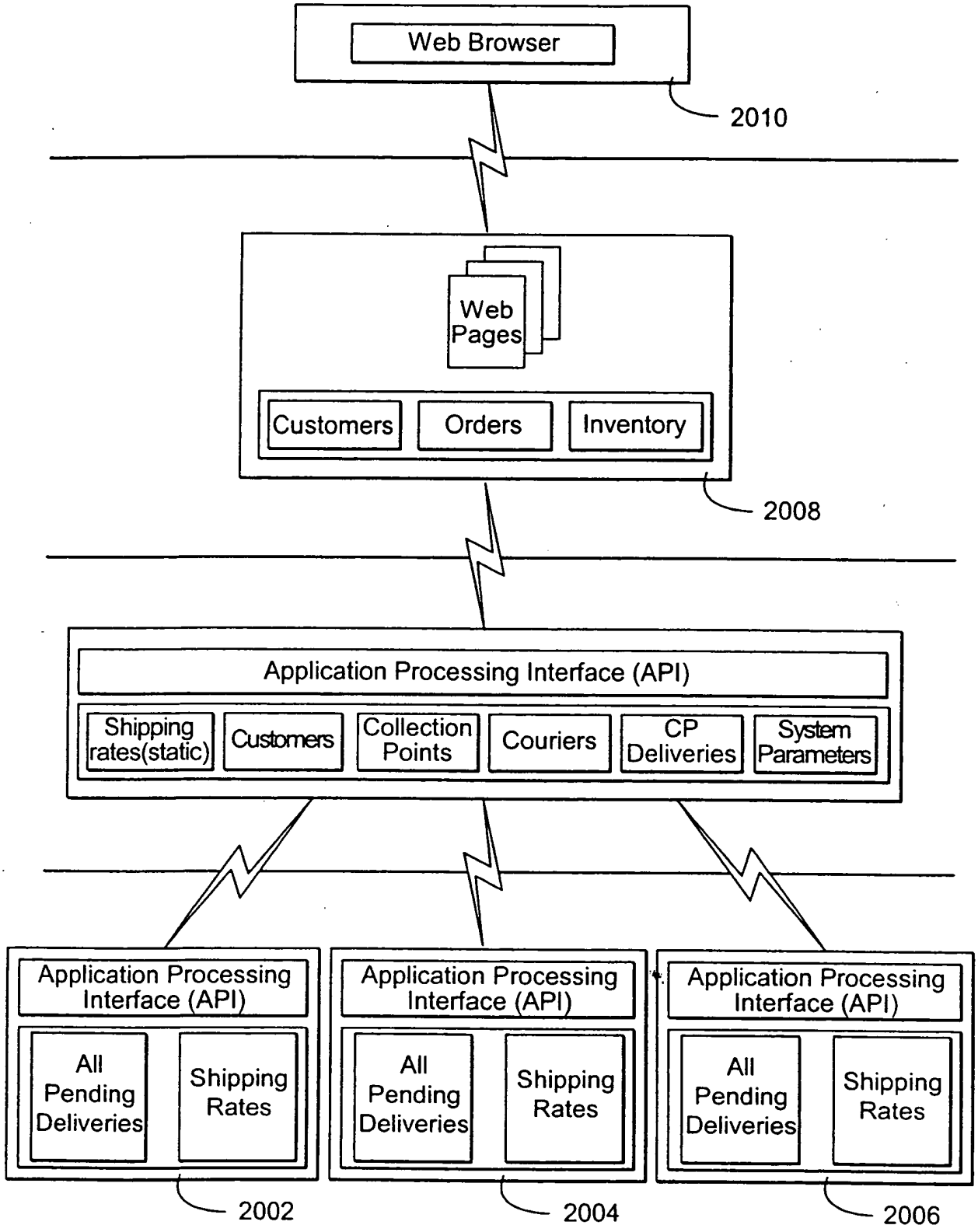
Web Browser
2010
Web Pages
Customers
Orders
Inventory
2008
Application Processing Interface (API)
Shipping rates(static)
Customers
Collection Points
Couriers
CP Deliveries
System Parameters
Application Processing Interface (API)
All Pending Deliveries
Shipping Rates
2002
Application Processing Interface (API)
All Pending Deliveries
Shipping Rates
2004
Application Processing Interface (API)
All Pending Deliveries
Shipping Rates
2006
2000

FIG. 19

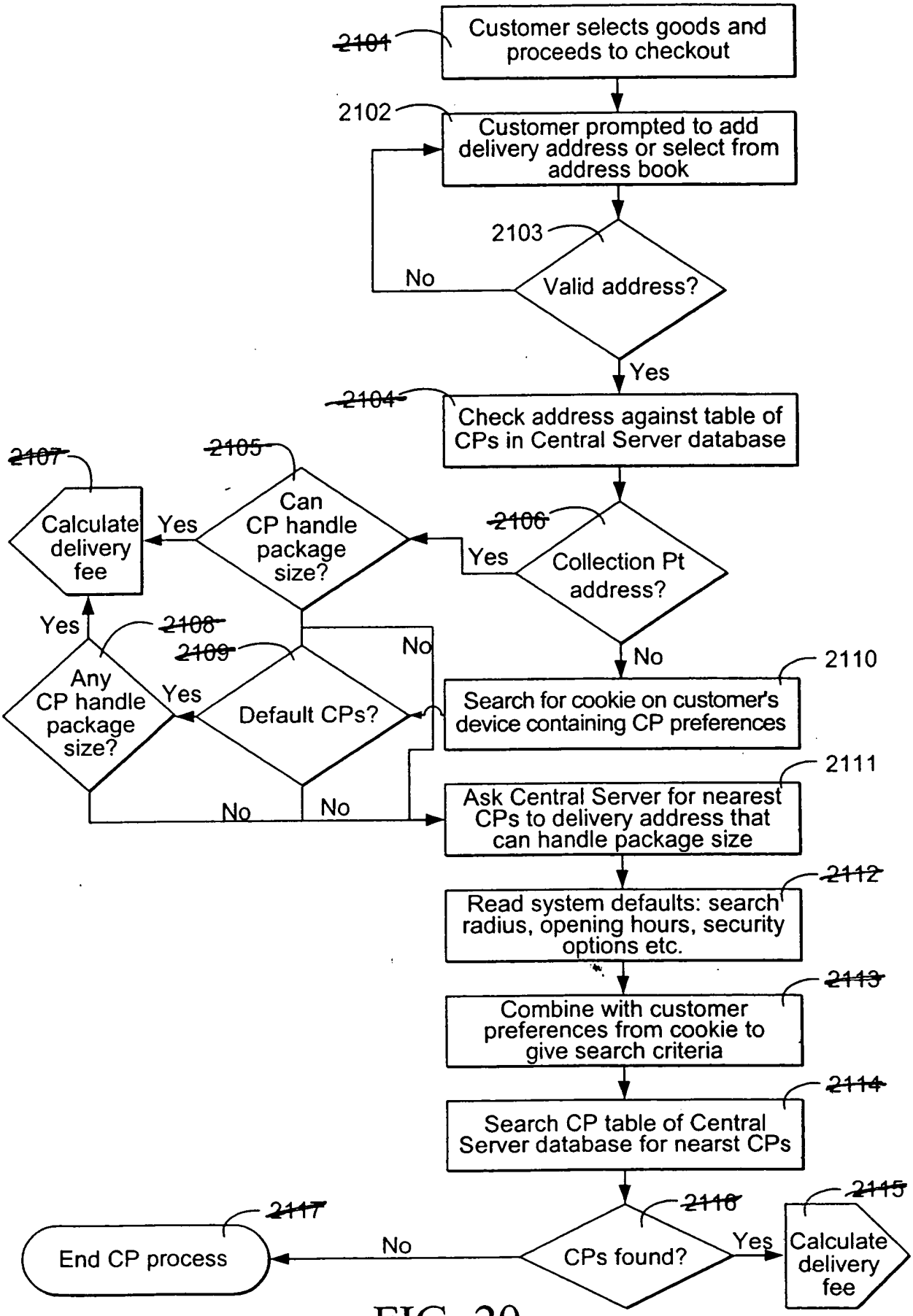
2101
Customer selects goods and proceeds to checkout
2102
Customer prompted to add delivery address or select from address book
2103
Valid address?
No
Yes
2104
Check address against table of CPs in Central Server database
2105
Can CP handle package size?
2106
Collection Pt address?
Yes
2107
Calculate delivery fee
Yes
2108
Any CP handle package size?
Yes
2109
Default CPs?
No
No
No
2110
Search for cookie on customer's device containing CP preferences
2111
Ask Central Server for nearest CPs to delivery address that can handle package size
2112
Read system defaults: search radius, opening hours, security options etc.
2113
Combine with customer preferences from cookie to give search criteria
2114
Search CP table of Central Server database for nearst CPs
2115
2116
CPs found?
No
Yes
Calculate delivery fee
2117
End CP process

FIG. 20

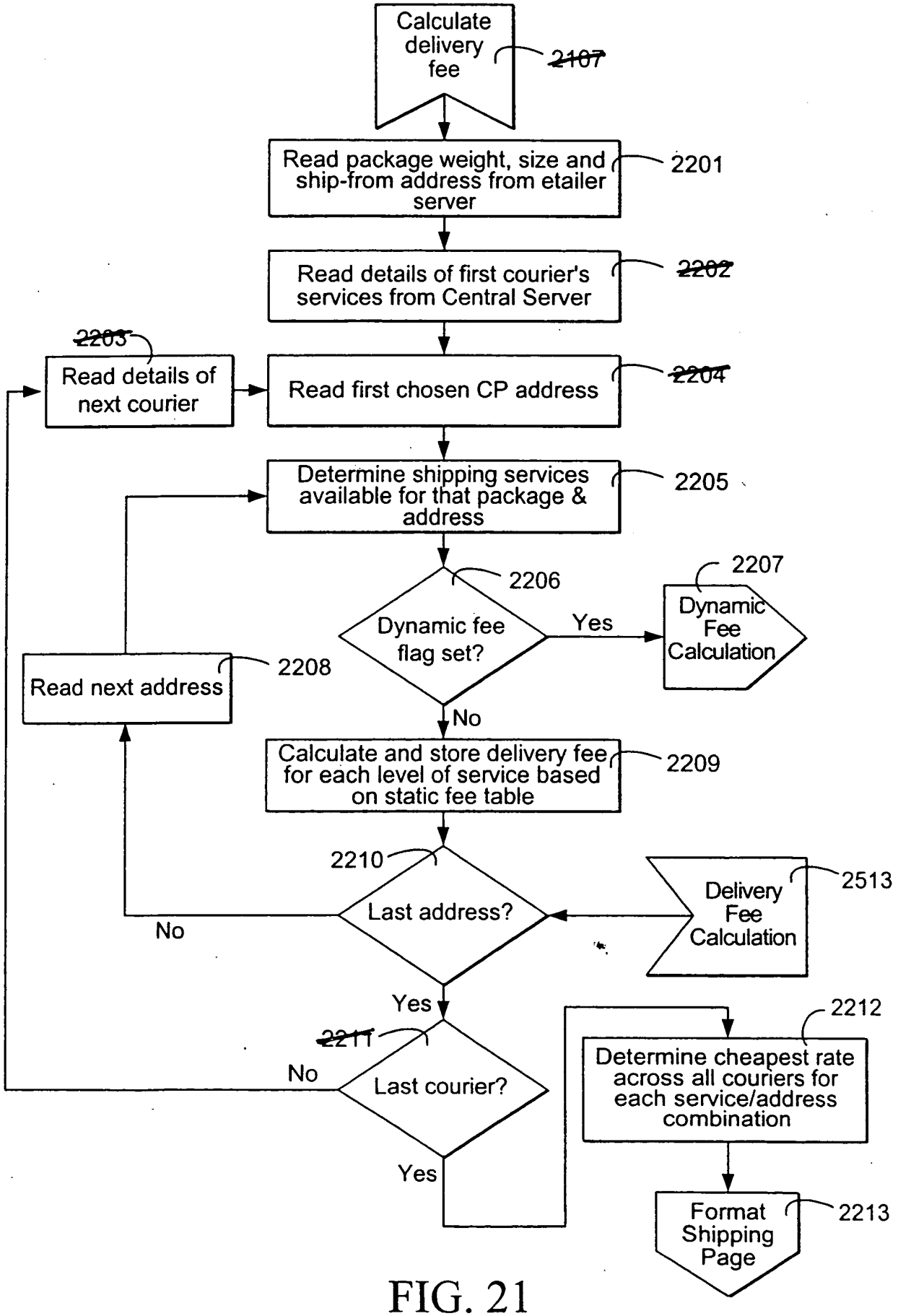
Calculate delivery fee
2107
Read package weight, size and ship-from address from etailer server
2201
Read details of first courier's services from Central Server
2202
2203
Read details of next courier
Read first chosen CP address
2204
Determine shipping services available for that package & address
2205
2206
Dynamic fee flag set?
Yes
2207
Dynamic Fee Calculation
No
Read next address
2208
Calculate and store delivery fee for each level of service based on static fee table
2209
2210
Last address?
No
Delivery Fee Calculation
2513
Yes
2211
Last courier?
No
Yes
2212
Determine cheapest rate across all couriers for each service/address combination
Format Shipping Page
2213

FIG. 21

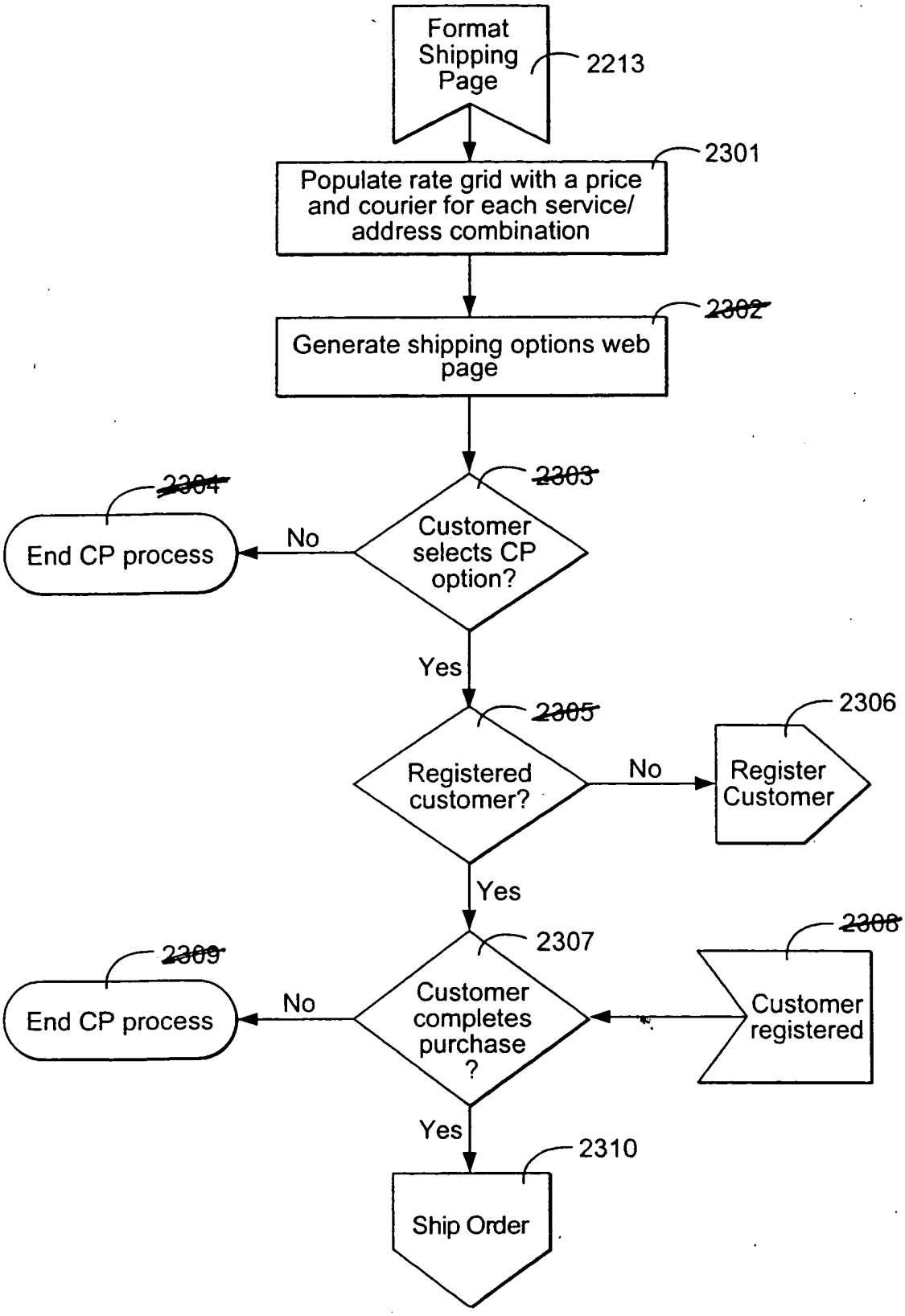
Format Shipping Page
2213
Populate rate grid with a price and courier for each service/ address combination
2301
Generate shipping options web page
2302
Customer selects CP option?
2303
No
End CP process
2304
Yes
Registered customer?
2305
No
Register Customer
2306
Yes
Customer completes purchase ?
2307
No
End CP process
2309
Customer registered
2308
Yes
Ship Order
2310

FIG. 22

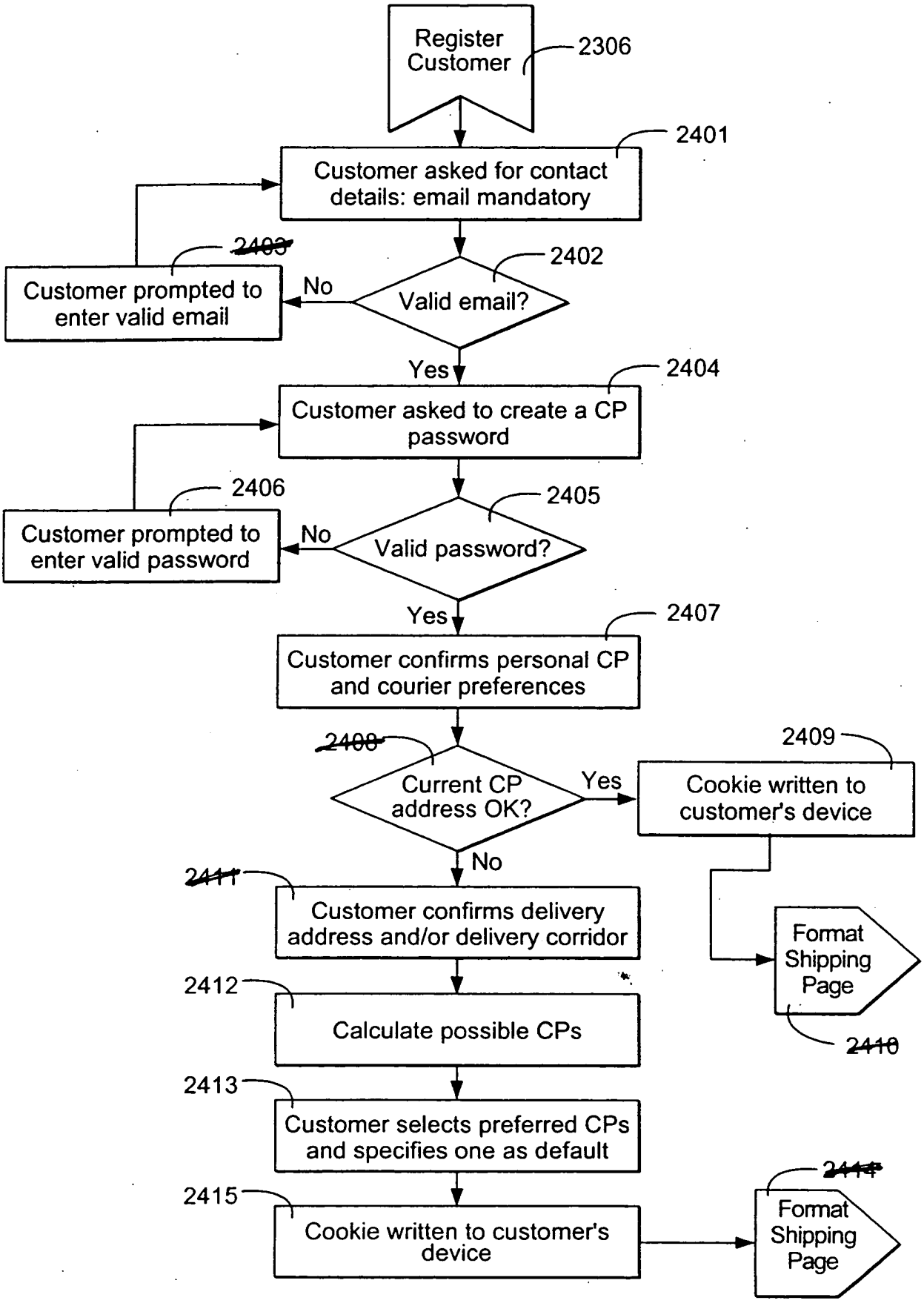
Register Customer
2306
2401
Customer asked for contact details: email mandatory
2402
Valid email?
No
2403
Customer prompted to enter valid email
Yes
2404
Customer asked to create a CP password
2405
Valid password?
No
2406
Customer prompted to enter valid password
Yes
2407
Customer confirms personal CP and courier preferences
2408
Current CP address OK?
Yes
2409
Cookie written to customer's device
No
2411
Customer confirms delivery address and/or delivery corridor
Format Shipping Page
2410
2412
Calculate possible CPs
2413
Customer selects preferred CPs and specifies one as default
2415
Cookie written to customer's device
2414
Format Shipping Page

FIG. 23

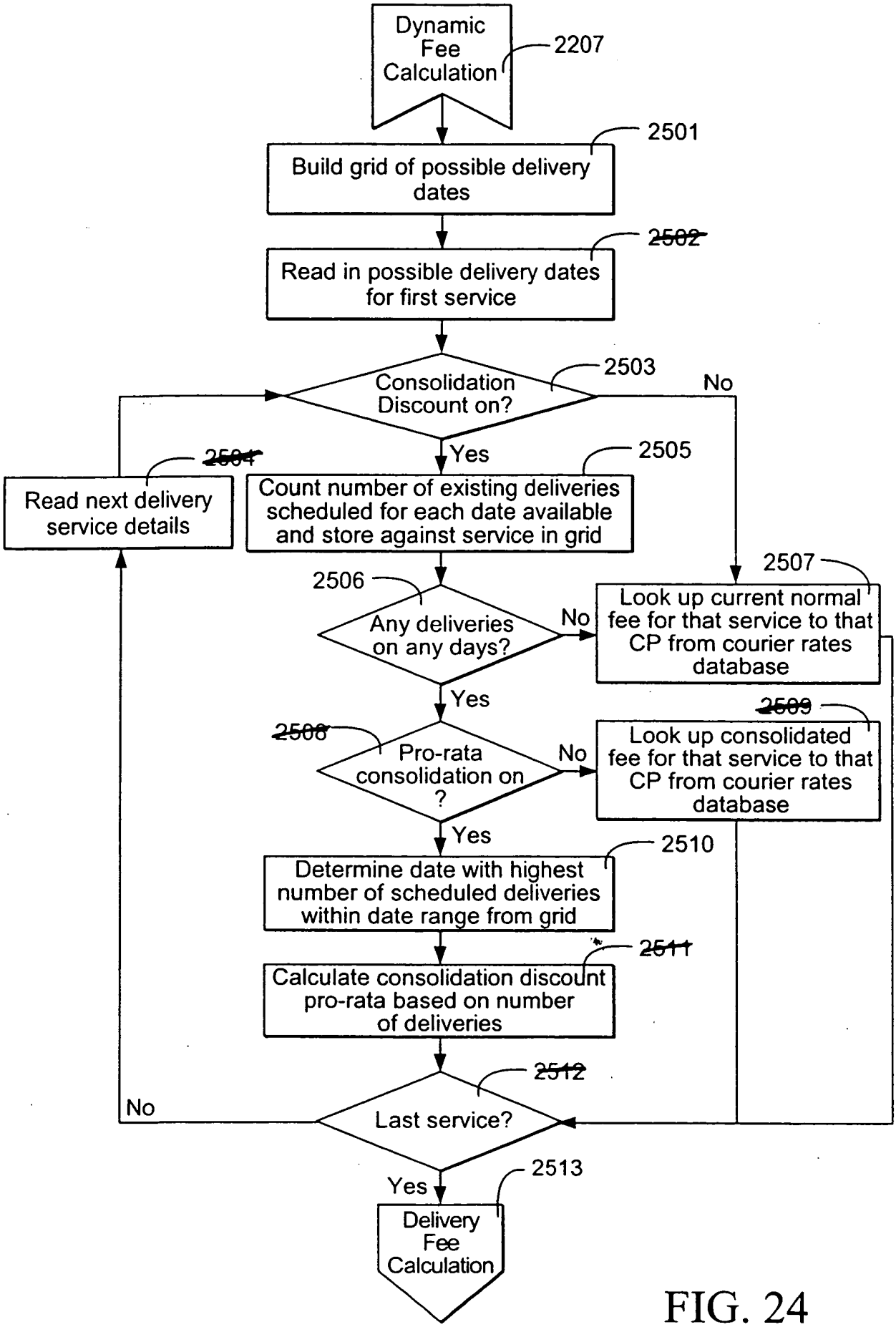
Dynamic Fee Calculation
2207
2501
Build grid of possible delivery dates
2502
Read in possible delivery dates for first service
2503
Consolidation Discount on?
No
Yes
2505
Count number of existing deliveries scheduled for each date available and store against service in grid
2504
Read next delivery service details
2506
Any deliveries on any days?
No
2507
Look up current normal fee for that service to that CP from courier rates database
Yes
2508
Pro-rata consolidation on ?
No
2509
Look up consolidated fee for that service to that CP from courier rates database
Yes
2510
Determine date with highest number of scheduled deliveries within date range from grid
2511
Calculate consolidation discount pro-rata based on number of deliveries
2512
Last service?
No
Yes
2513
Delivery Fee Calculation

FIG. 24

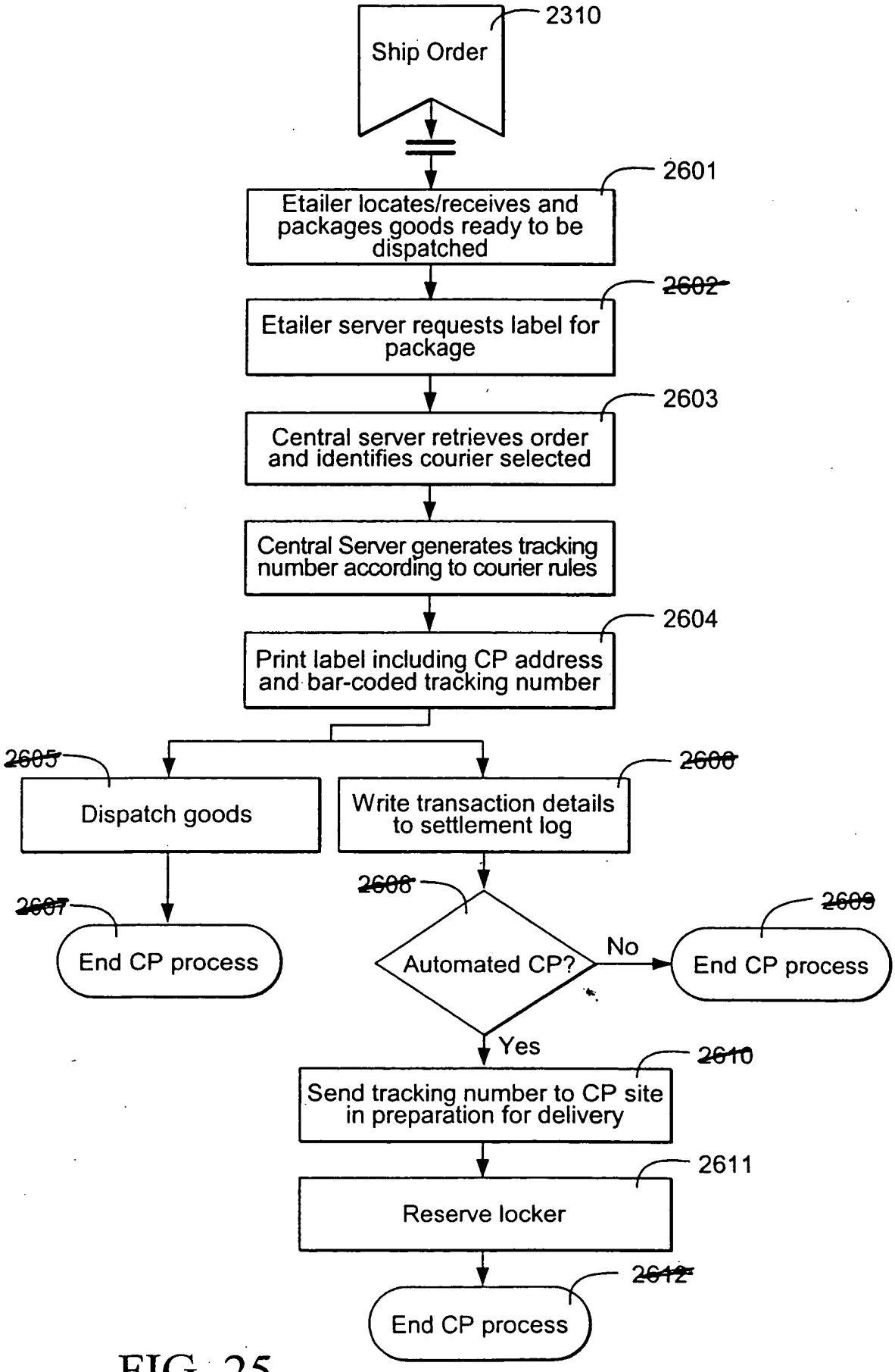
Ship Order
2310
Etailer locates/receives and packages goods ready to be dispatched
2601
Etailer server requests label for package
2602
Central server retrieves order and identifies courier selected
2603
Central Server generates tracking number according to courier rules
Print label including CP address and bar-coded tracking number
2604
Dispatch goods
2605
Write transaction details to settlement log
2606
End CP process
2607
Automated CP?
No
End CP process
2609
Yes
Send tracking number to CP site in preparation for delivery
2610
Reserve locker
2611
End CP process
2612

FIG. 25

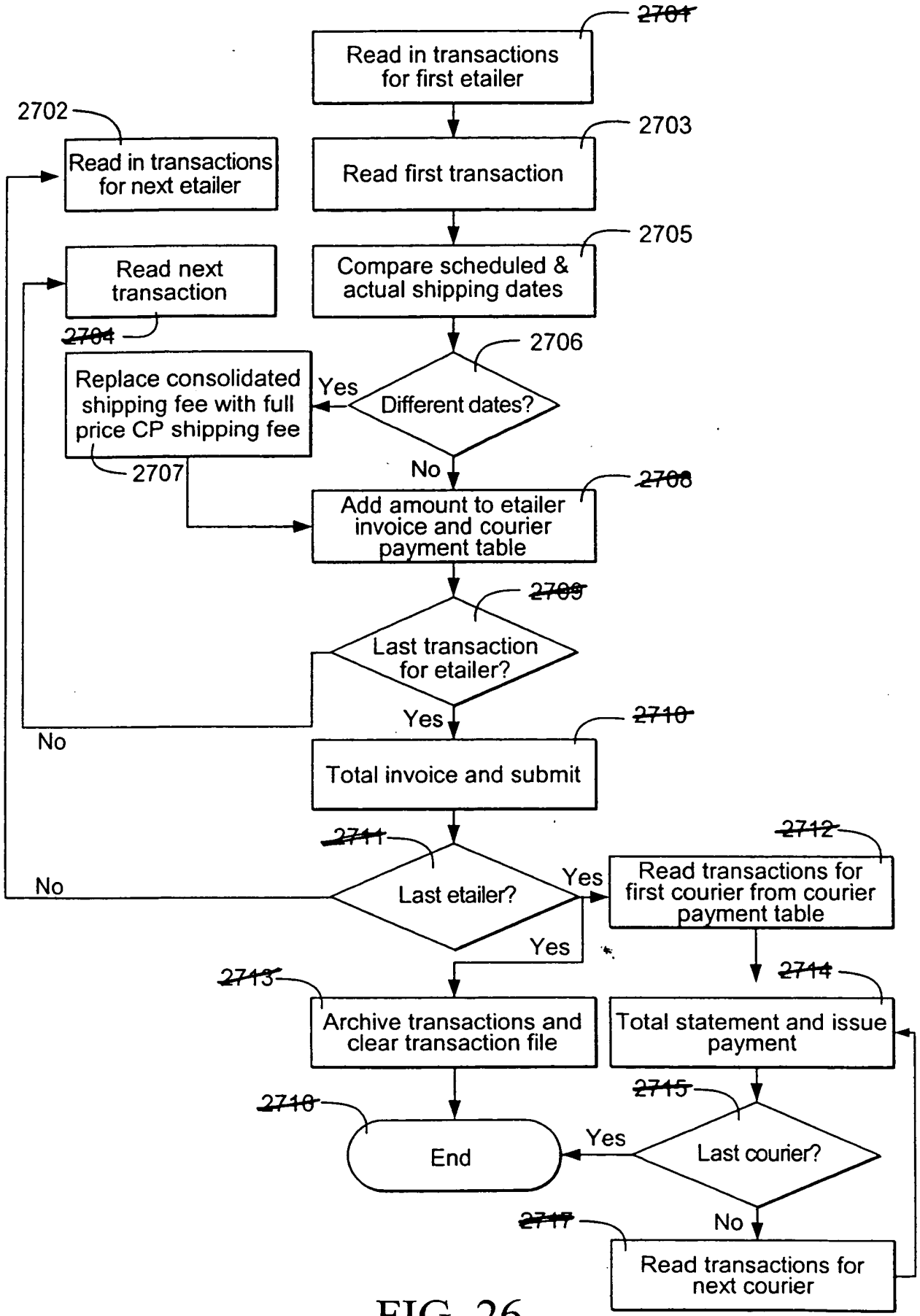
2701
Read in transactions for first etailer
2702
Read in transactions for next etailer
2703
Read first transaction
2705
Compare scheduled & actual shipping dates
Read next transaction
2704
2706
Replace consolidated shipping fee with full price CP shipping fee
Yes
Different dates?
No
2707
2708
Add amount to etailer invoice and courier payment table
2709
Last transaction for etailer?
Yes
No
2710
Total invoice and submit
2711
Last etailer?
Yes
No
Yes
2712
Read transactions for first courier from courier payment table
2713
Archive transactions and clear transaction file
2714
Total statement and issue payment
2715
Last courier?
Yes
2716
End
No
2717
Read transactions for next courier

FIG. 26

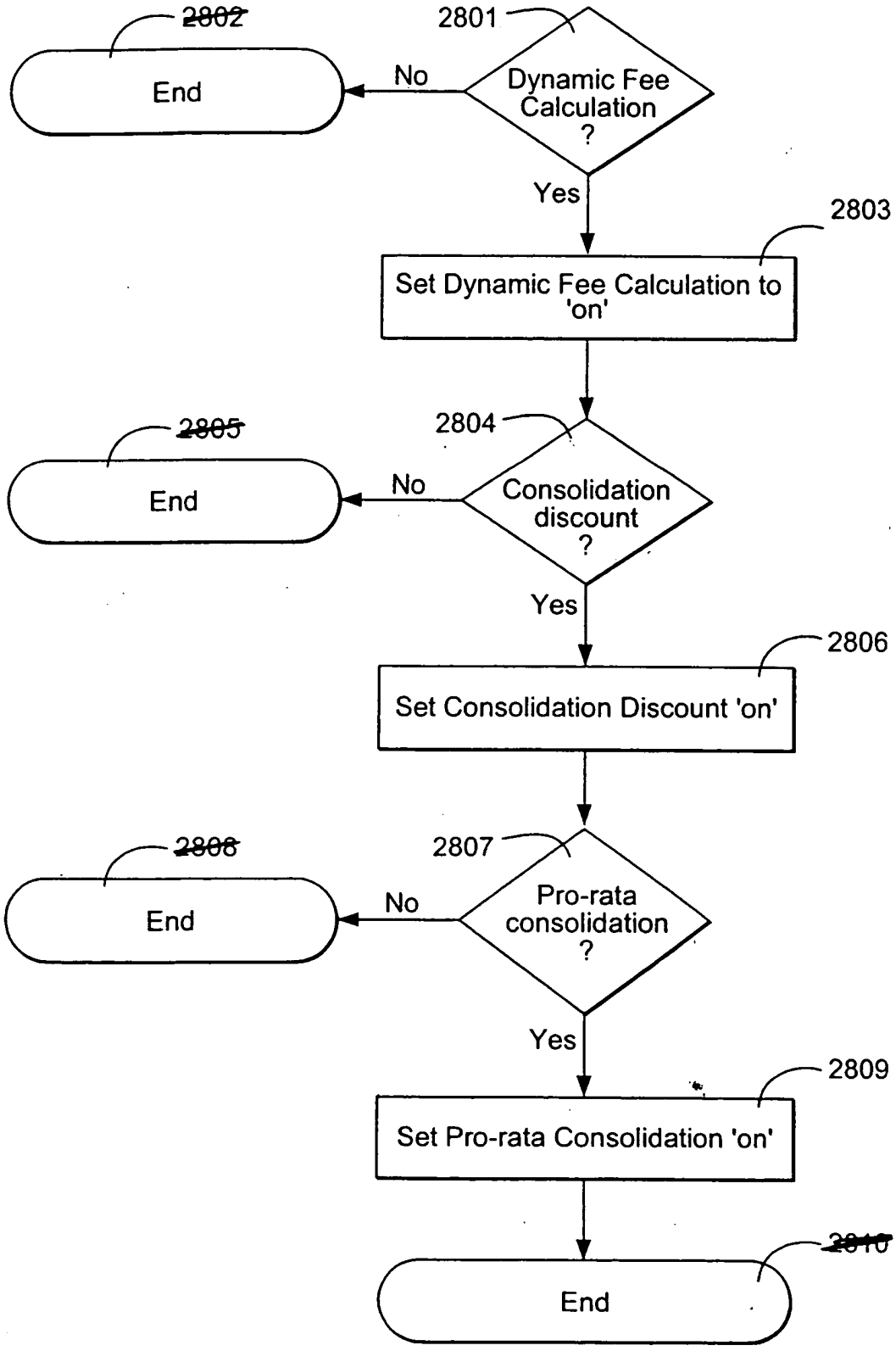
2801
Dynamic Fee Calculation ?
No
2802
End
Yes
2803
Set Dynamic Fee Calculation to 'on'
2804
Consolidation discount ?
No
2805
End
Yes
2806
Set Consolidation Discount 'on'
2807
Pro-rata consolidation ?
No
2808
End
Yes
2809
Set Pro-rata Consolidation 'on'
2810
End

FIG. 27

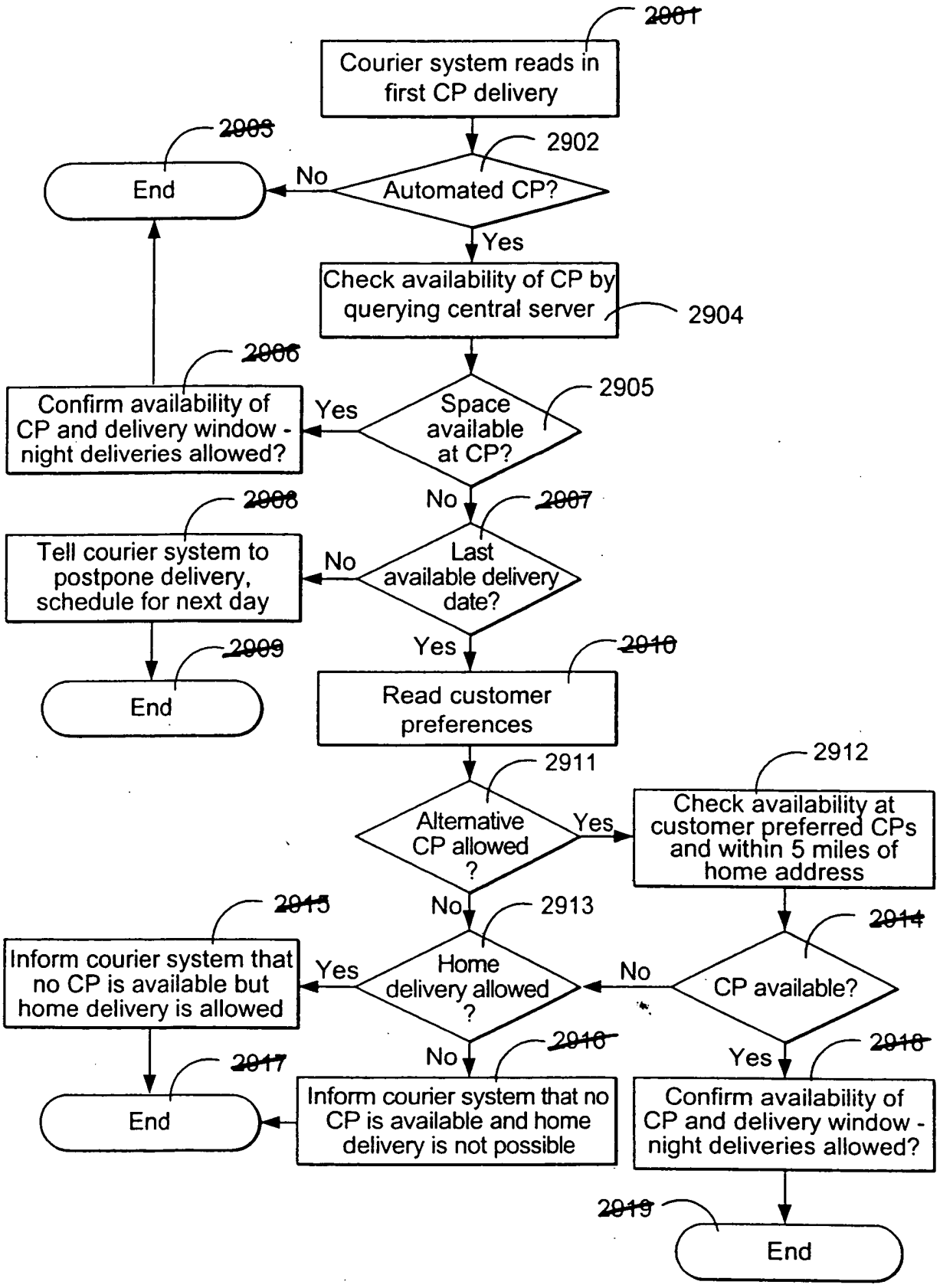
2001
Courier system reads in first CP delivery
2002
Automated CP?
No
2003
End
Yes
Check availability of CP by querying central server
2904
2905
Space available at CP?
Yes
2006
Confirm availability of CP and delivery window - night deliveries allowed?
No
2007
Last available delivery date?
No
2008
Tell courier system to postpone delivery, schedule for next day
2009
End
Yes
2010
Read customer preferences
2911
Alternative CP allowed ?
Yes
2912
Check availability at customer preferred CPs and within 5 miles of home address
No
2913
Home delivery allowed ?
Yes
2015
Inform courier system that no CP is available but home delivery is allowed
2017
End
No
2914
CP available?
No
2016
Inform courier system that no CP is available and home delivery is not possible
Yes
2018
Confirm availability of CP and delivery window - night deliveries allowed?
2019
End

FIG. 28

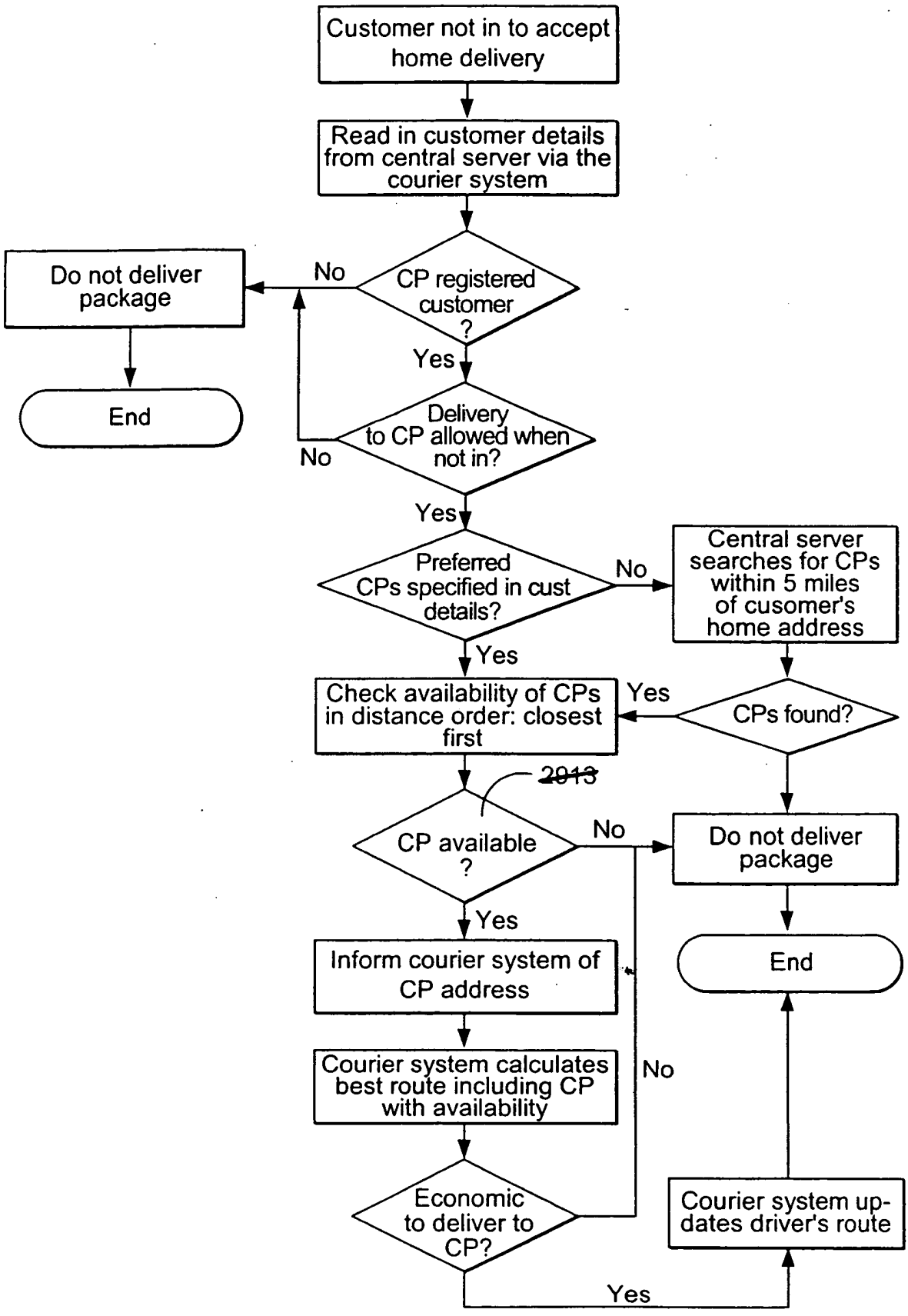
Customer not in to accept home delivery
Read in customer details from central server via the courier system
CP registered customer ?
No
Do not deliver package
End
Yes
Delivery to CP allowed when not in?
No
Yes
Preferred CPs specified in cust details?
No
Central server searches for CPs within 5 miles of cusomer's home address
Yes
CPs found?
Yes
Check availability of CPs in distance order: closest first
2013
CP available ?
No
Do not deliver package
Yes
End
Inform courier system of CP address
Courier system calculates best route including CP with availability
No
Economic to deliver to CP?
Courier system up-dates driver's route
Yes

FIG. 29

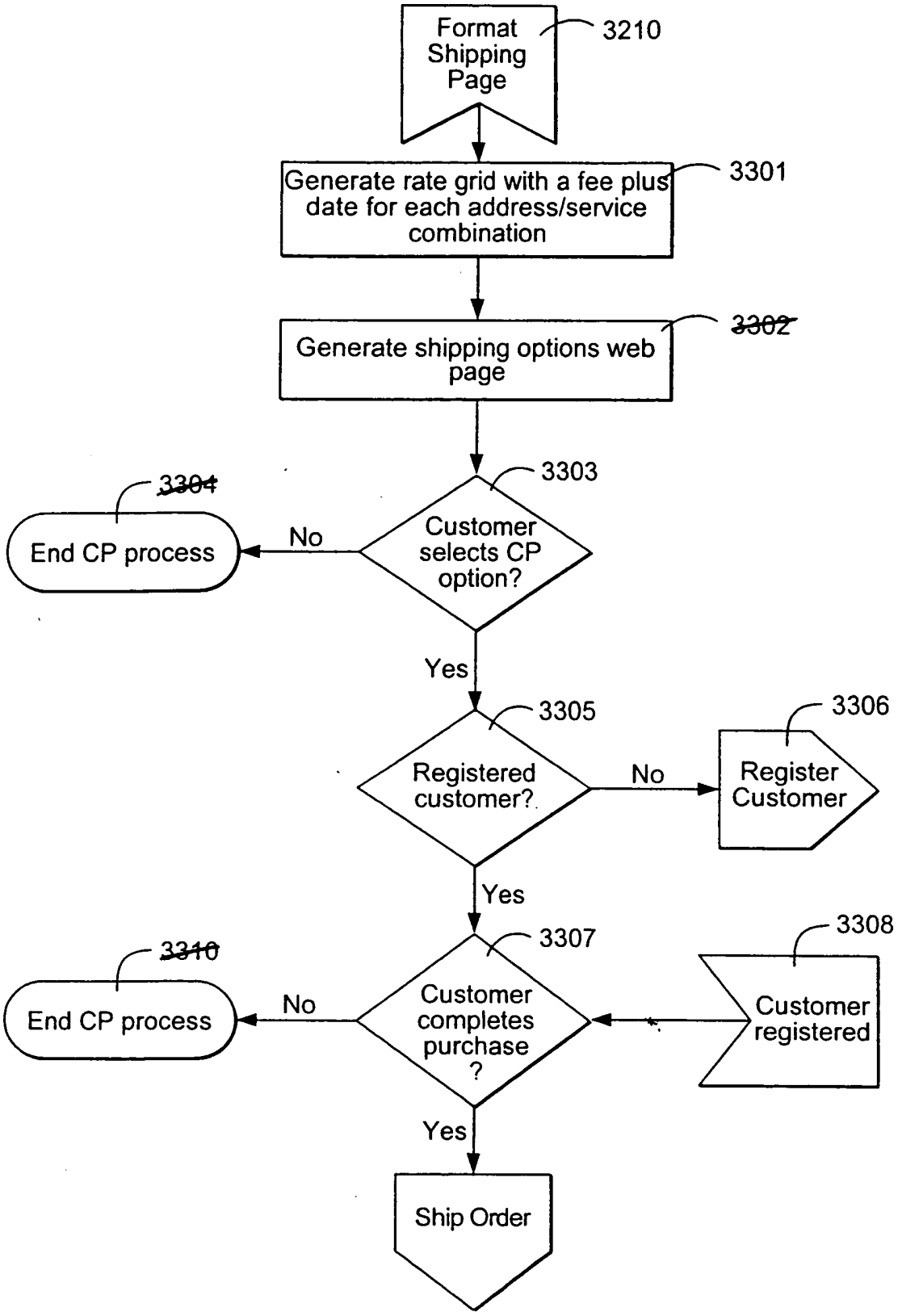
Format Shipping Page
3210
Generate rate grid with a fee plus date for each address/service combination
3301
Generate shipping options web page
3302
Customer selects CP option?
3303
No
End CP process
3304
Yes
Registered customer?
3305
No
Register Customer
3306
Yes
Customer completes purchase ?
3307
No
End CP process
3310
Customer registered
3308
Yes
Ship Order

FIG. 33

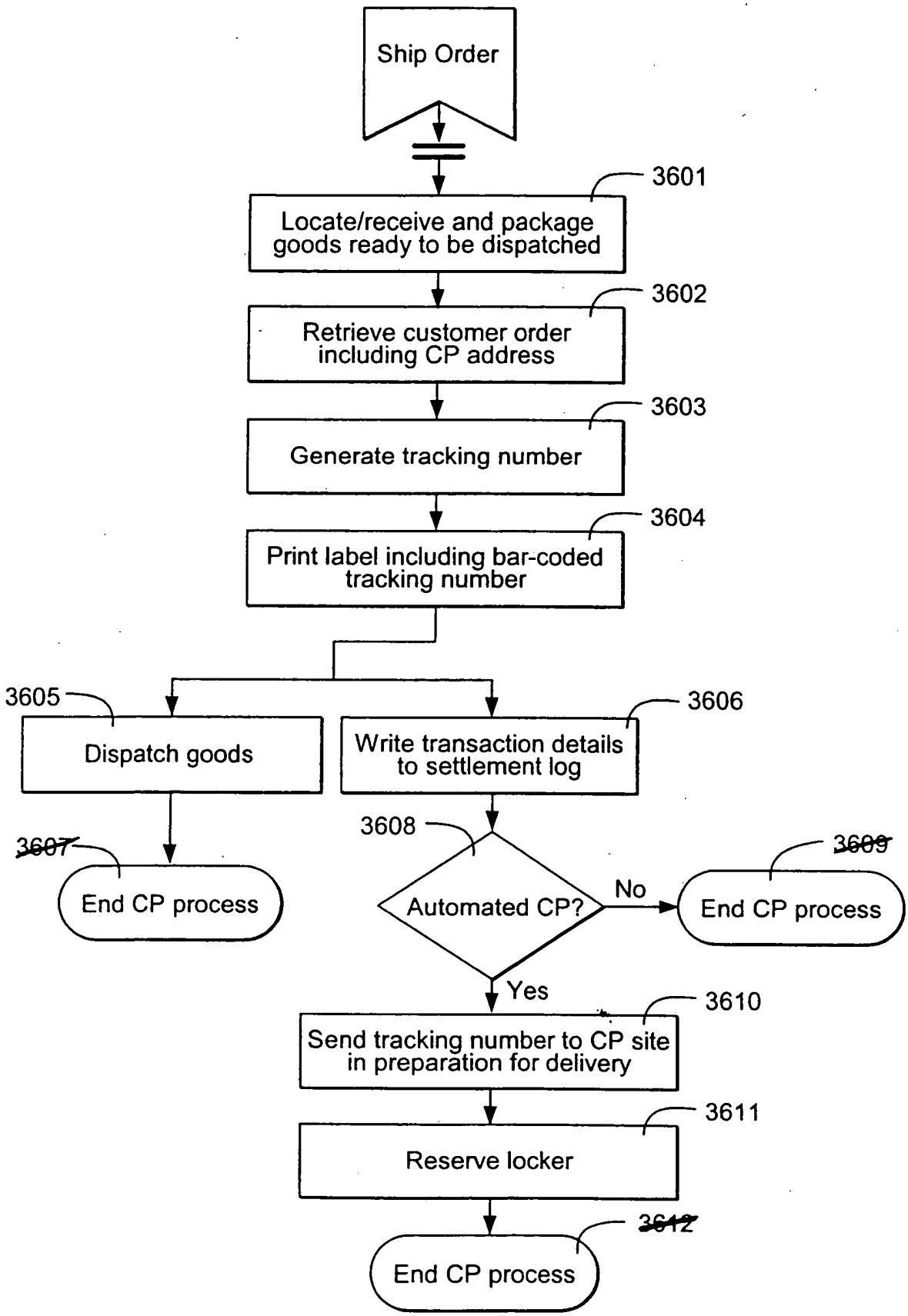
Ship Order
3601
Locate/receive and package goods ready to be dispatched
3602
Retrieve customer order including CP address
3603
Generate tracking number
3604
Print label including bar-coded tracking number
3605
Dispatch goods
3606
Write transaction details to settlement log
3607
End CP process
3608
Automated CP?
No
3609
End CP process
Yes
3610
Send tracking number to CP site in preparation for delivery
3611
Reserve locker
3612
End CP process

FIG. 36

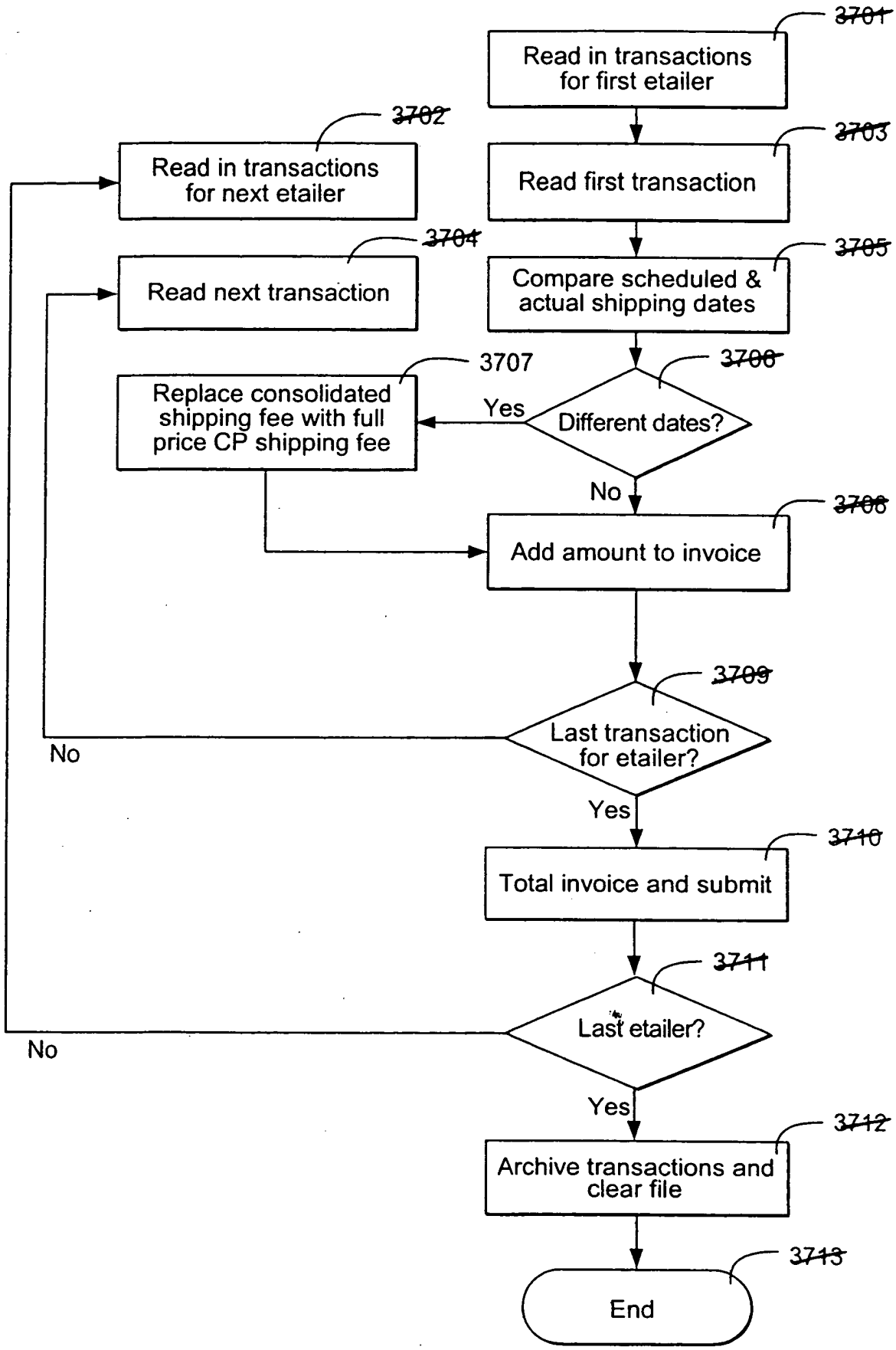
3701
Read in transactions for first etailer
3702
Read in transactions for next etailer
3703
Read first transaction
3704
Read next transaction
3705
Compare scheduled & actual shipping dates
3707
Replace consolidated shipping fee with full price CP shipping fee
Yes
3708
Different dates?
No
3706
Add amount to invoice
3709
Last transaction for etailer?
No
Yes
3710
Total invoice and submit
3711
Last etailer?
No
Yes
3712
Archive transactions and clear file
3713
End

FIG. 37

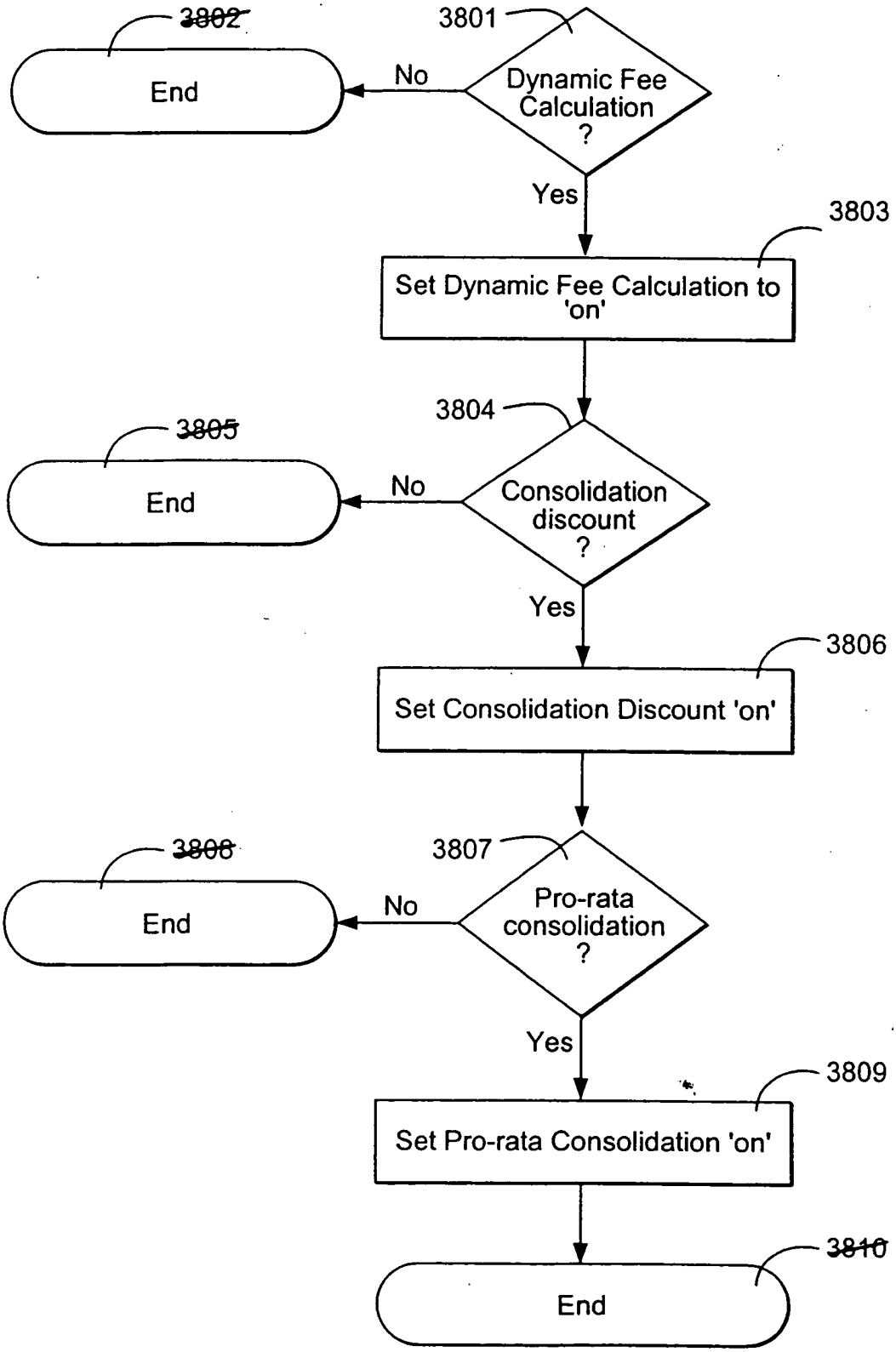
3801
Dynamic Fee Calculation ?
No
3802
End
Yes
3803
Set Dynamic Fee Calculation to 'on'
3804
Consolidation discount ?
No
3805
End
Yes
3806
Set Consolidation Discount 'on'
3807
Pro-rata consolidation ?
No
3808
End
Yes
3809
Set Pro-rata Consolidation 'on'
3810
End

FIG. 38

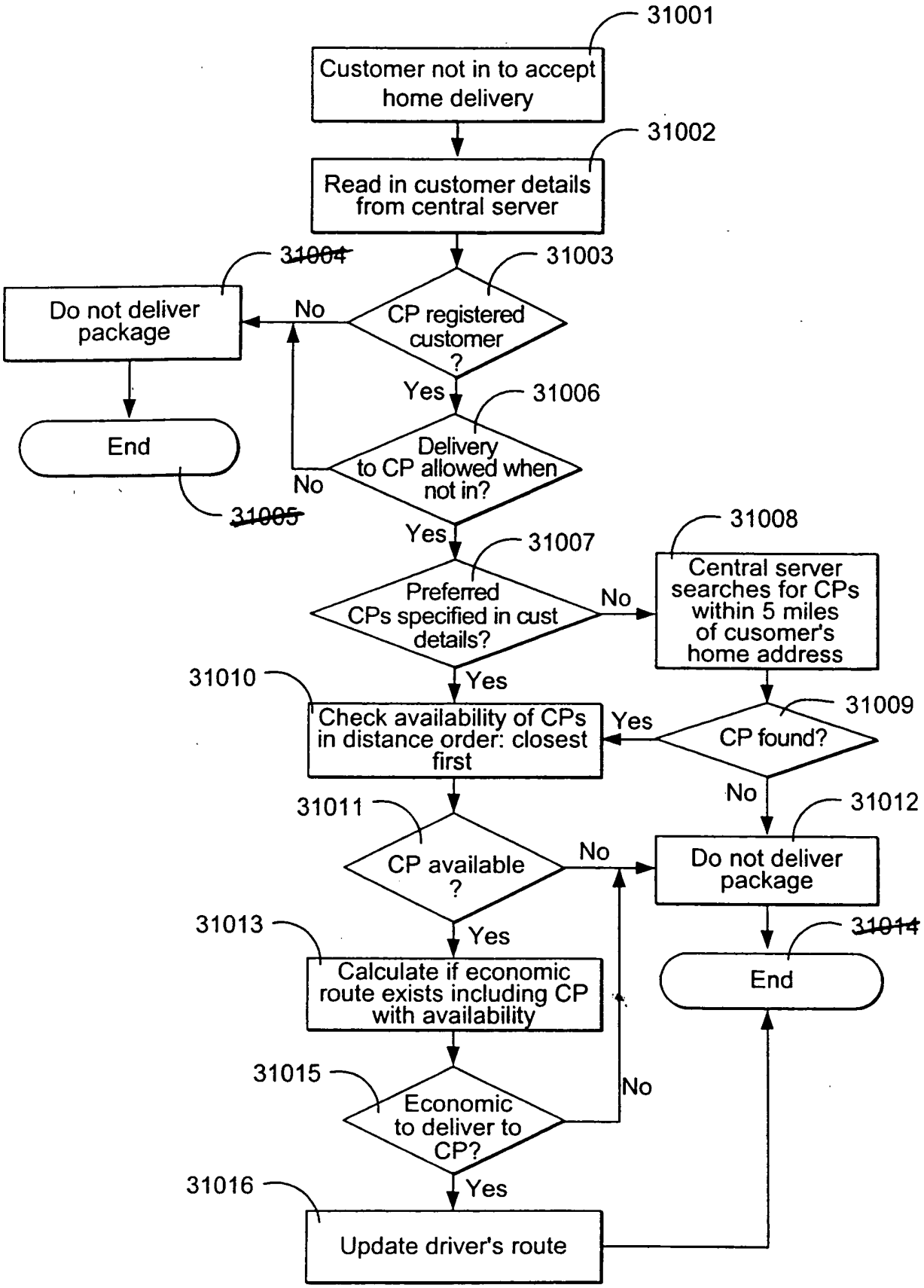
31001
Customer not in to accept home delivery
31002
Read in customer details from central server
31003
CP registered customer ?
No
31004
Do not deliver package
End
31005
Yes
31006
Delivery to CP allowed when not in?
No
Yes
31007
Preferred CPs specified in cust details?
No
31008
Central server searches for CPs within 5 miles of cusomer's home address
Yes
31009
CP found?
No
31010
Check availability of CPs in distance order: closest first
Yes
31011
CP available ?
No
31012
Do not deliver package
Yes
31013
Calculate if economic route exists including CP with availability
31014
End
31015
Economic to deliver to CP?
No
Yes
31016
Update driver's route

FIG. 40